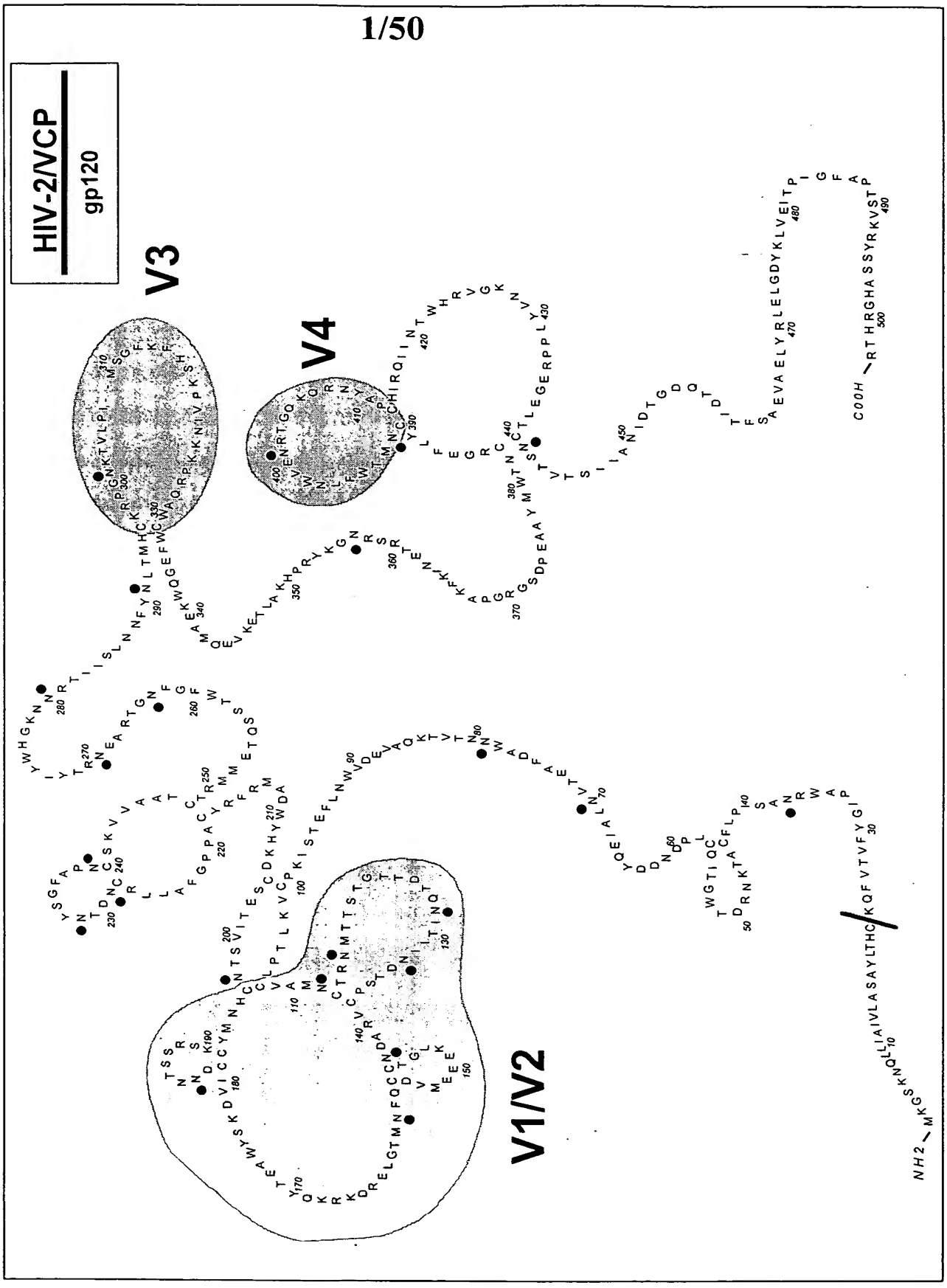

FIG. 1A

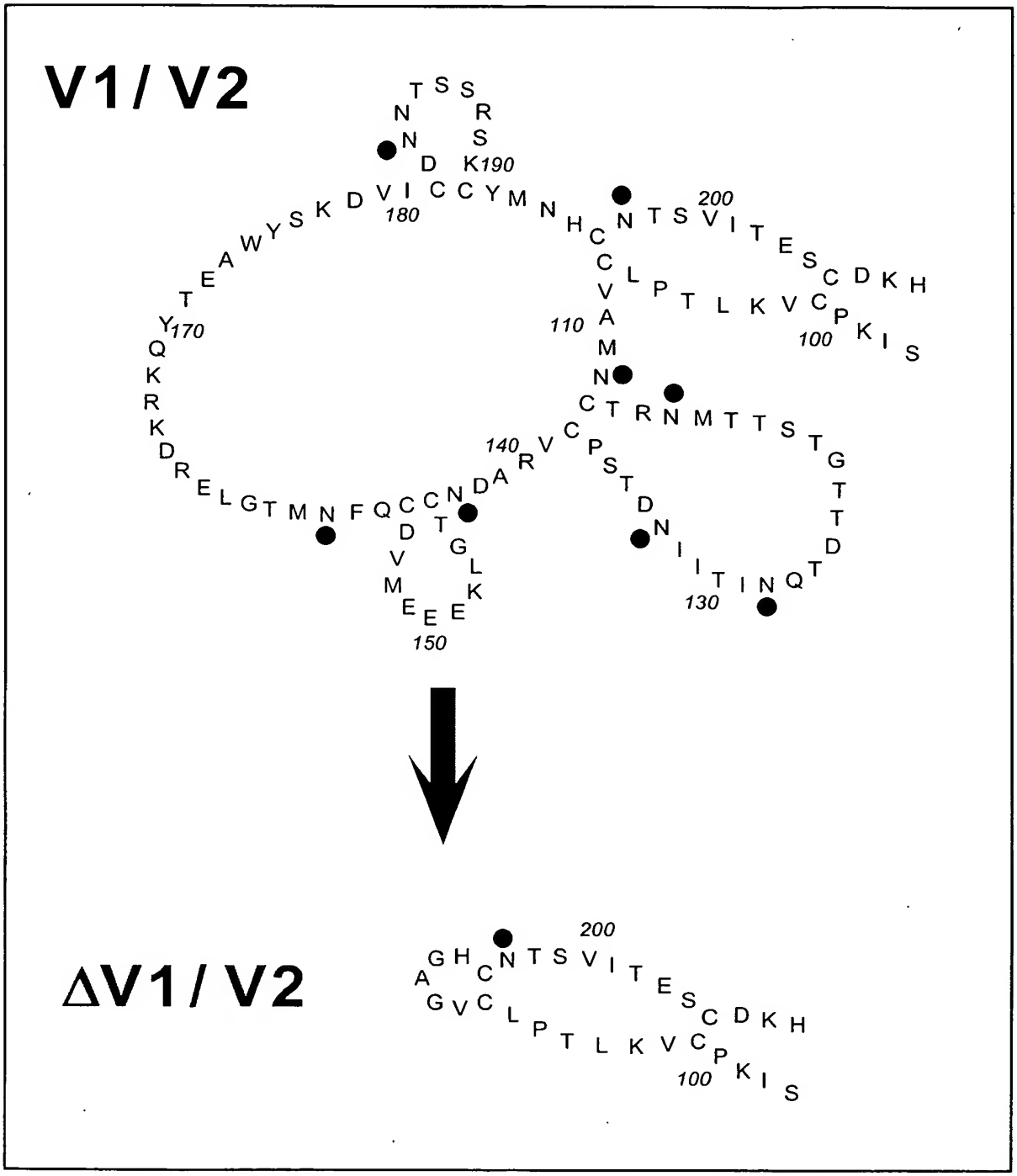
V1/V2
T S S
N R
N S
D K190
180
V I C C Y M N H C
200
N T S V I T E S C D K H
C L P T L K V C P K I S
100
110
V A M N
C T R N M T T S T G T T D
140
V C P S T D N I I T I N Q T
130
R A D C N T G L K E E E
150
T E A W Y S K D
Y170
Q K R K D R E L G T M N F Q C C N
D V M
ΔV1/V2
200
A G H C N T S V I T E S C D K H
G V C L P T L K V C P K I S
100

FIG. 1B

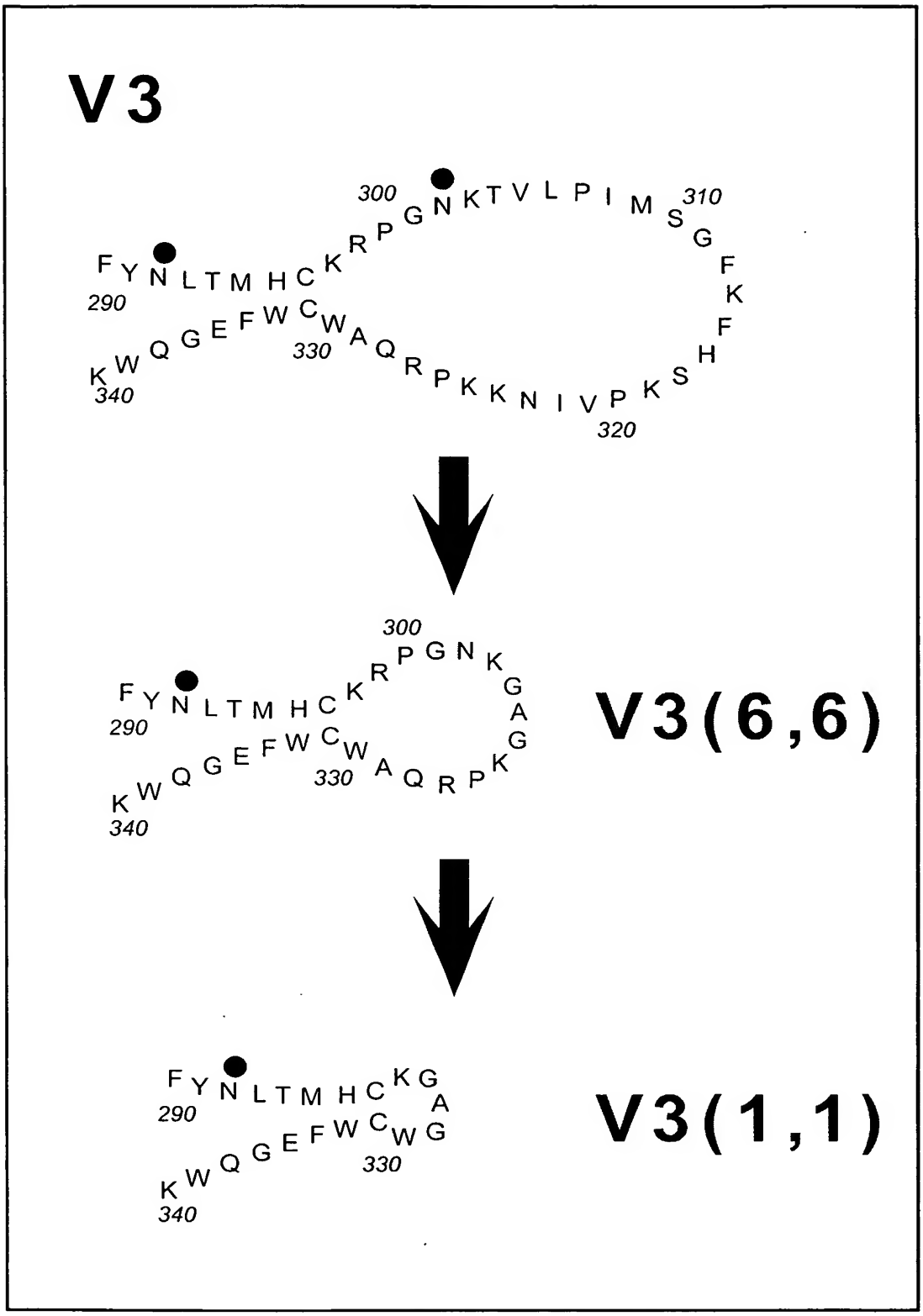

FIG. 1C

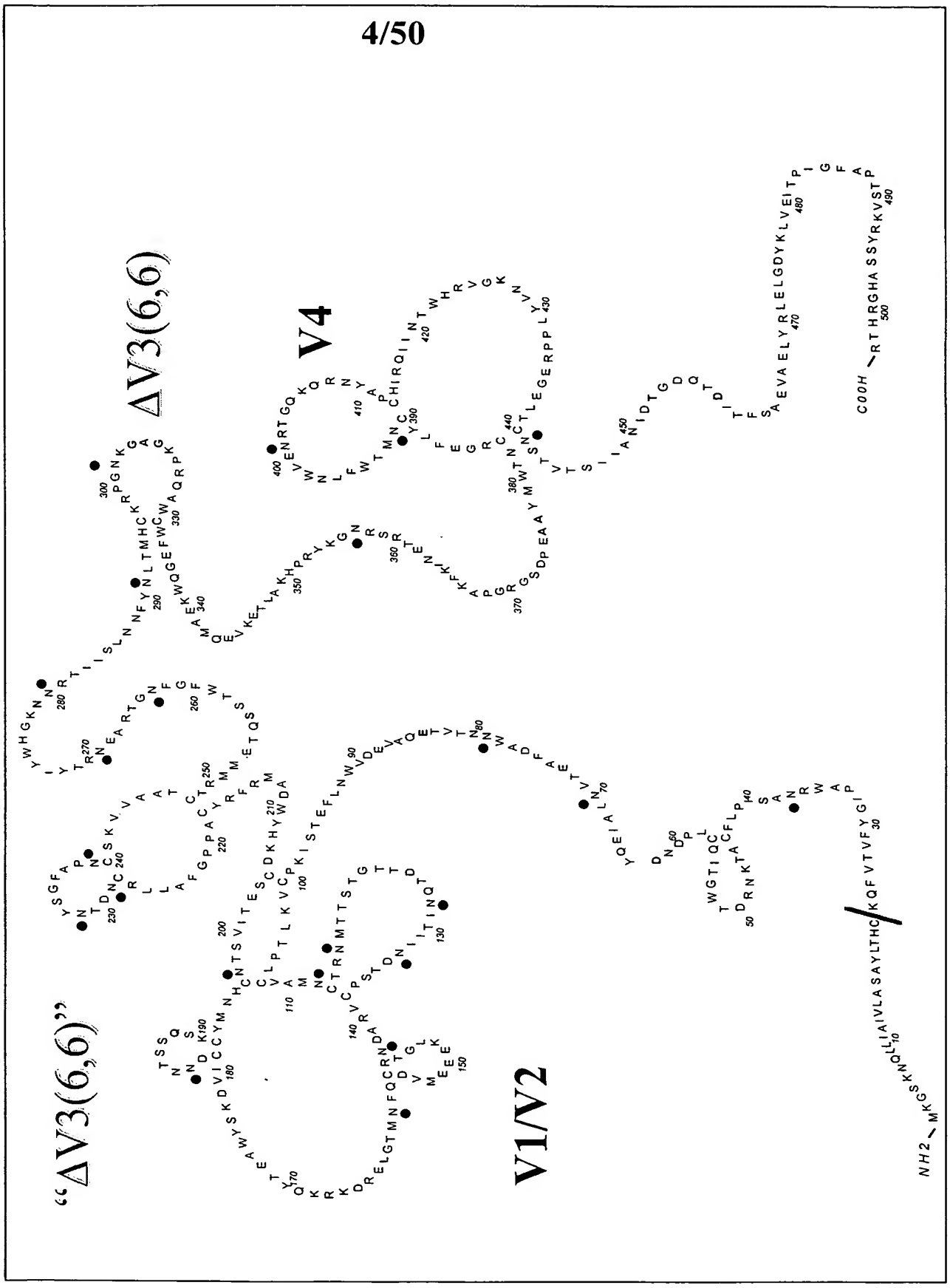

FIG. 1D

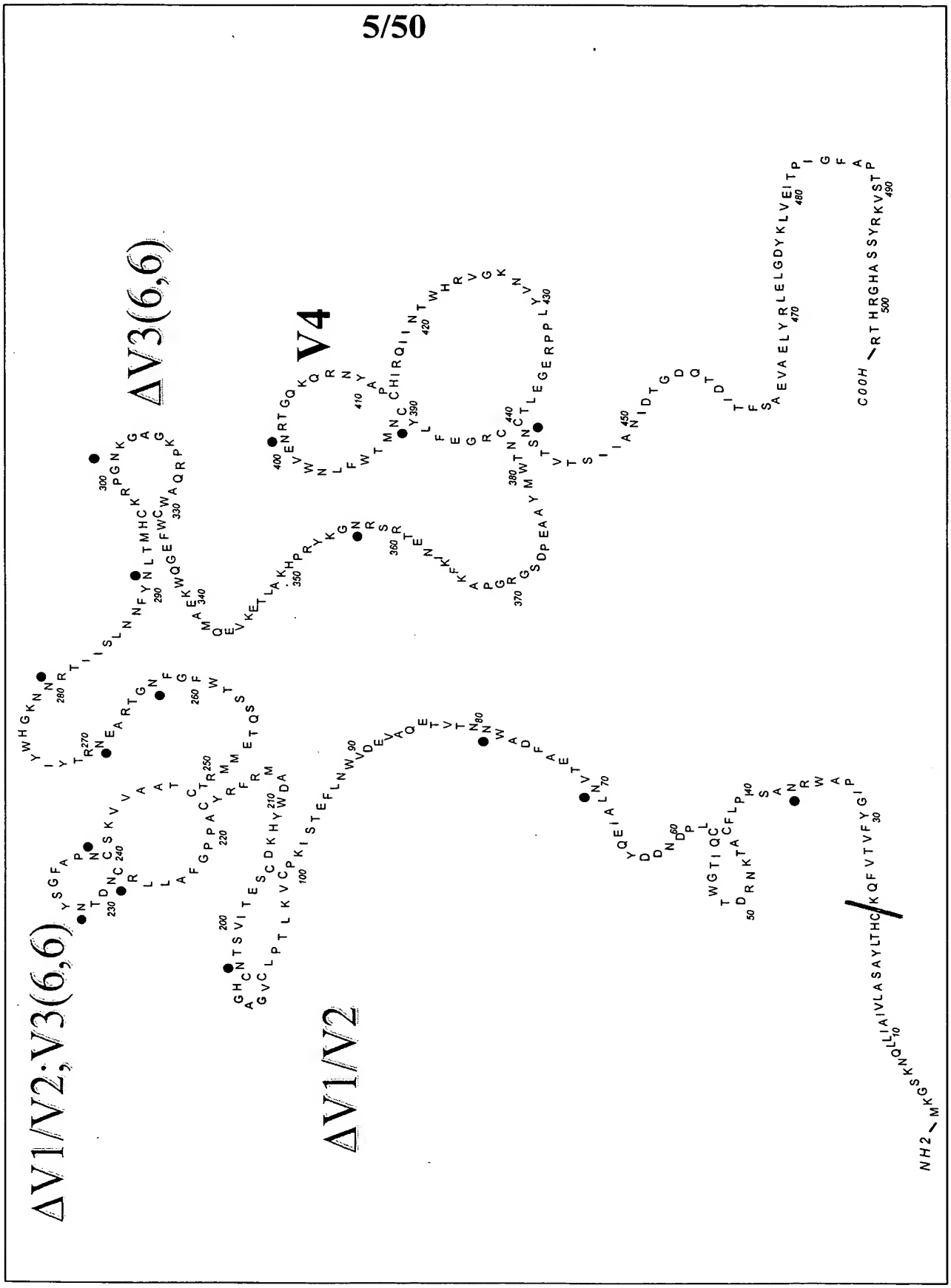

FIG. 1E

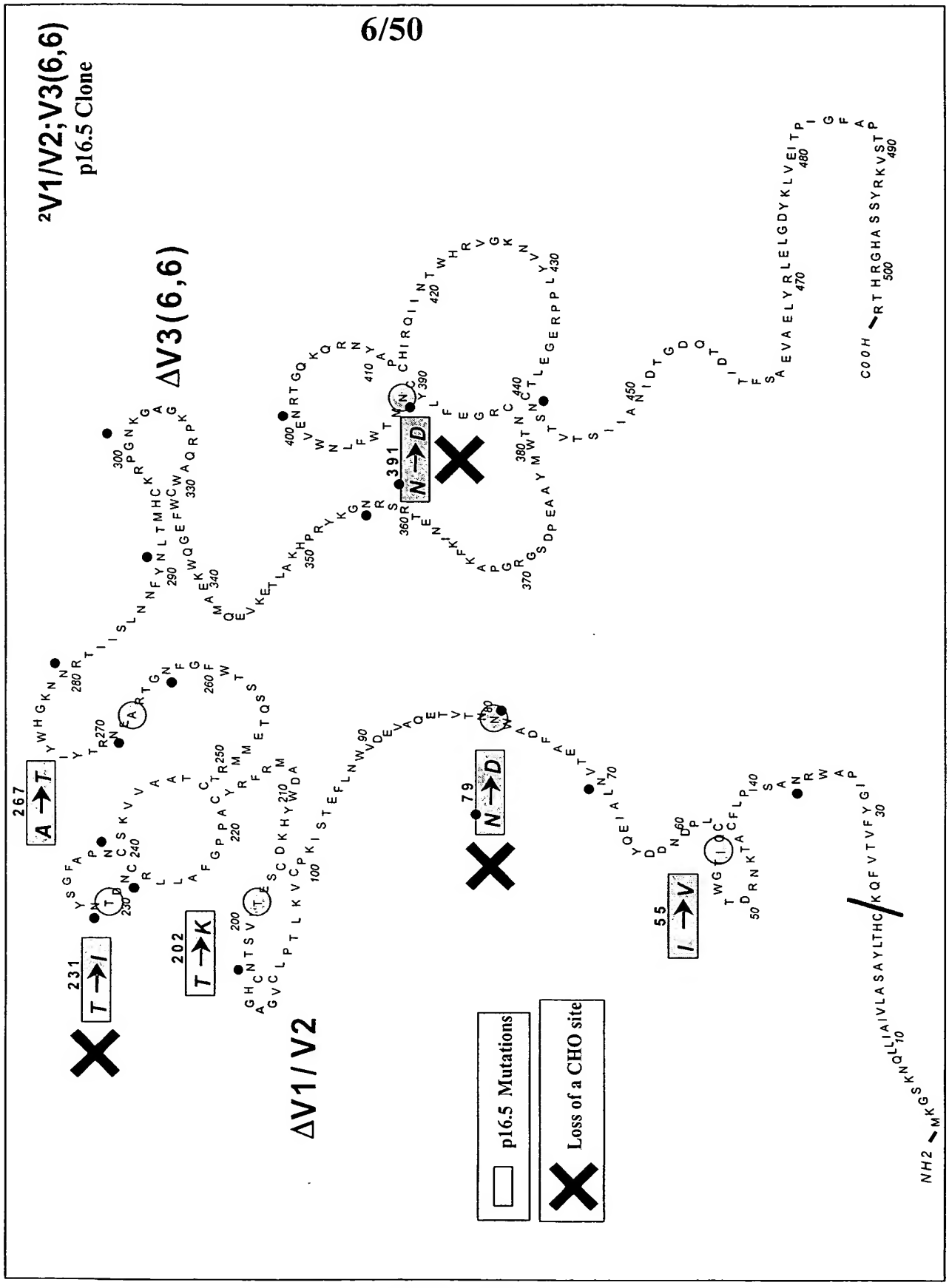
2V1/V2;V3(6,6)
p16.5 Clone
ΔV3(6,6)
ΔV1/V2
A→T
267
T→I
231
T→K
202
N→D
79
I→V
55
N→D
391
p16.5 Mutations
Loss of a CHO site
NH2
COOH

FIG. 1F

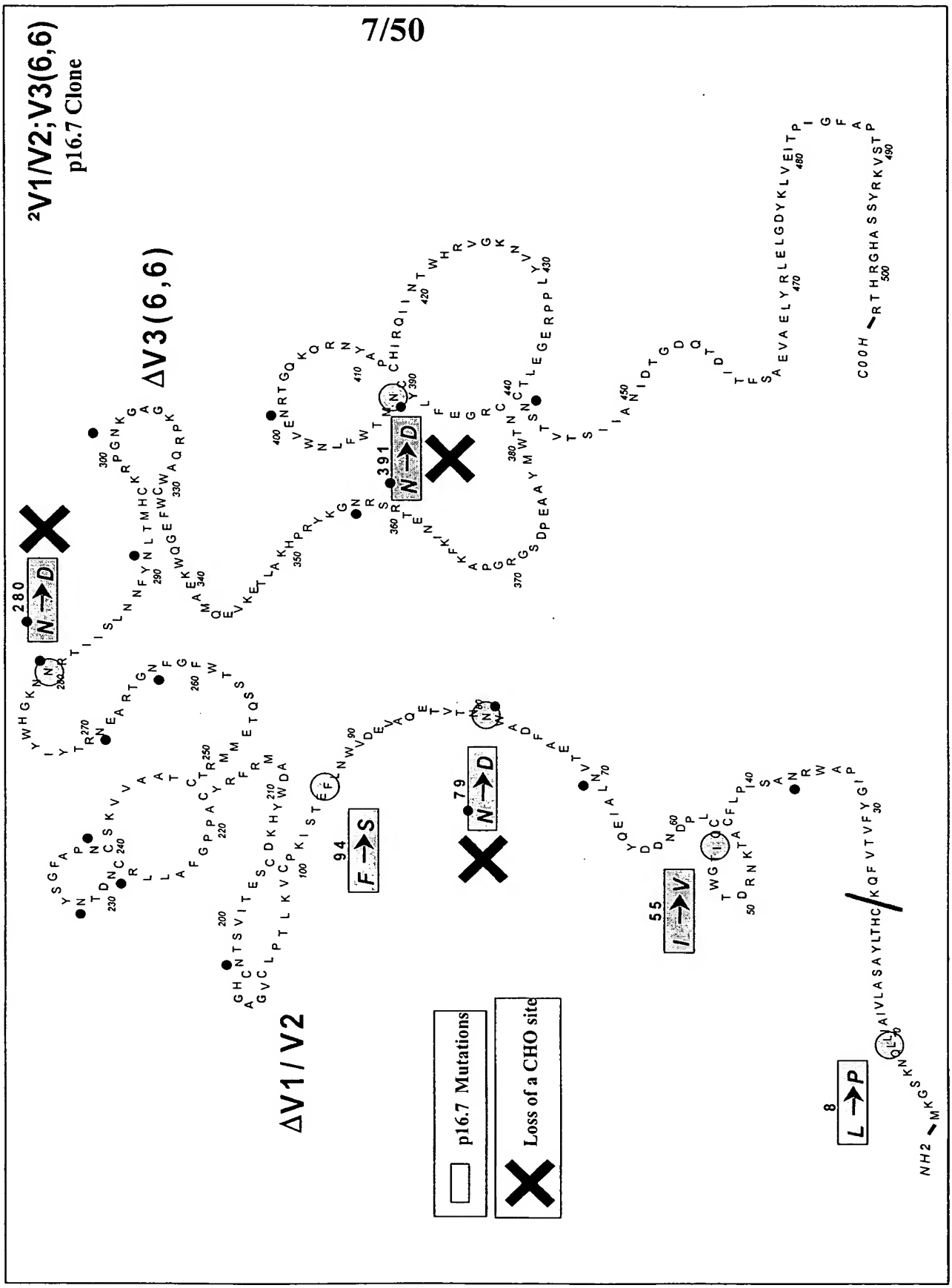
2V1/V2;V3(6,6)
p16.7 Clone
ΔV3(6,6)
ΔV1 / V2
280
N → D
391
N → D
79
N → D
94
F → S
55
I → V
8
L → P
p16.7 Mutations
Loss of a CHO site
NH2
COOH

FIG. 1G

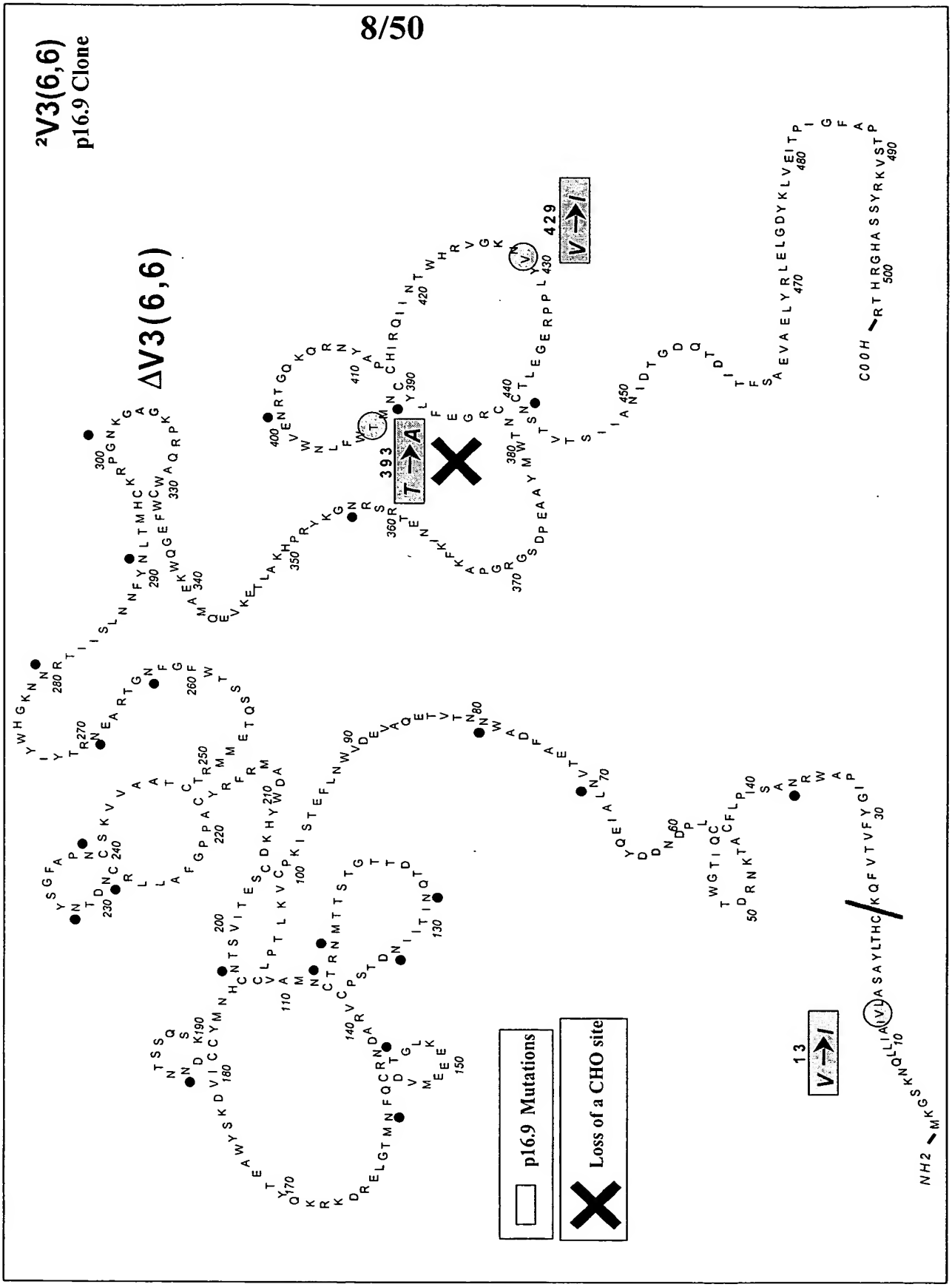
2V3(6,6)
p16.9 Clone
ΔV3(6,6)
T→A
393
V→I
429
V→I
13
p16.9 Mutations
Loss of a CHO site
NH2
COOH

FIG. 1H

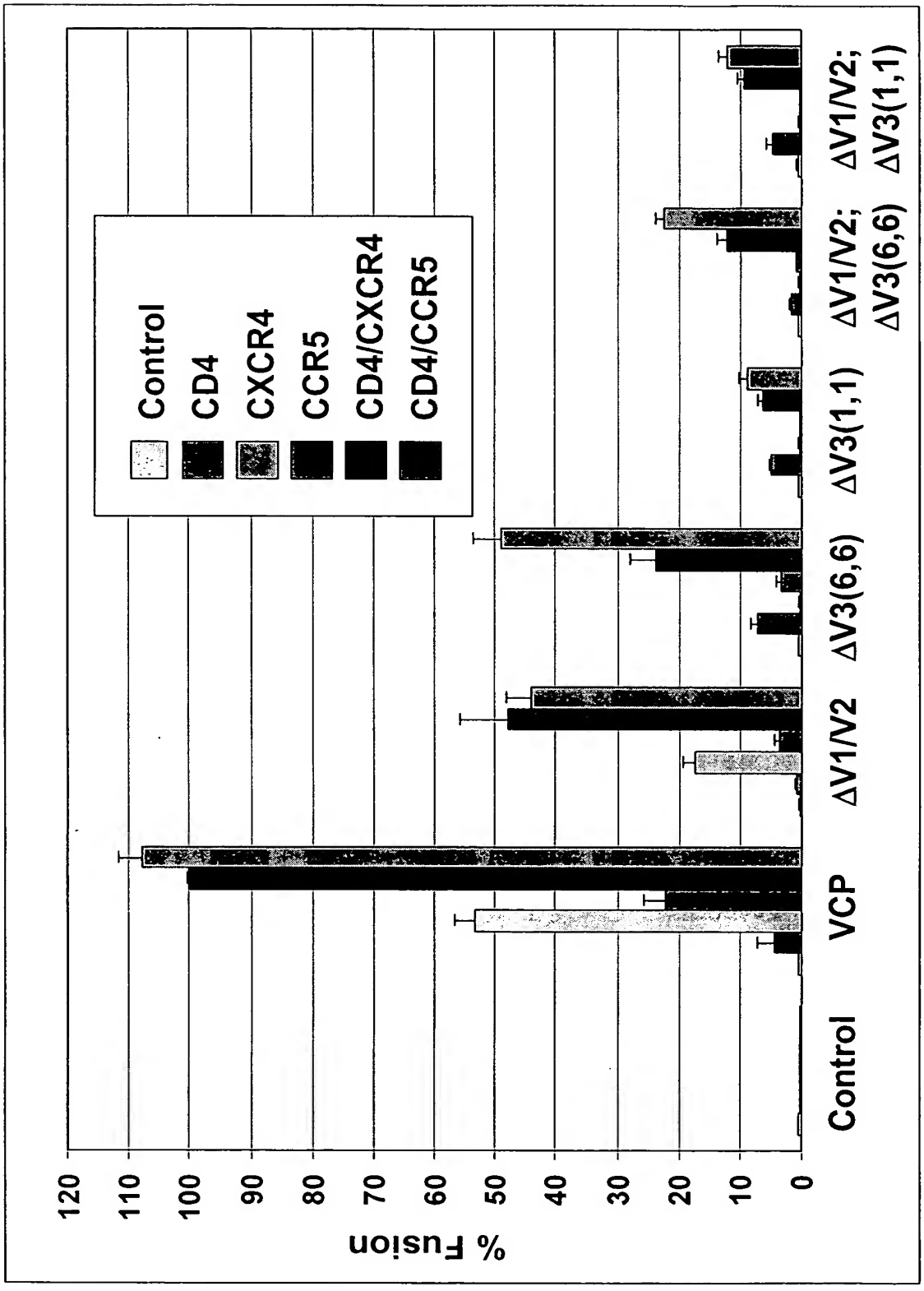
% Fusion
120
110
100
90
80
70
60
50
40
30
20
10
0
Control
CD4
CXCR4
CCR5
CD4/CXCR4
CD4/CCR5
Control
VCP
ΔV1/V2
ΔV3(6,6)
ΔV3(1,1)
ΔV1/V2; ΔV3(6,6)
ΔV1/V2; ΔV3(1,1)

FIG. 2

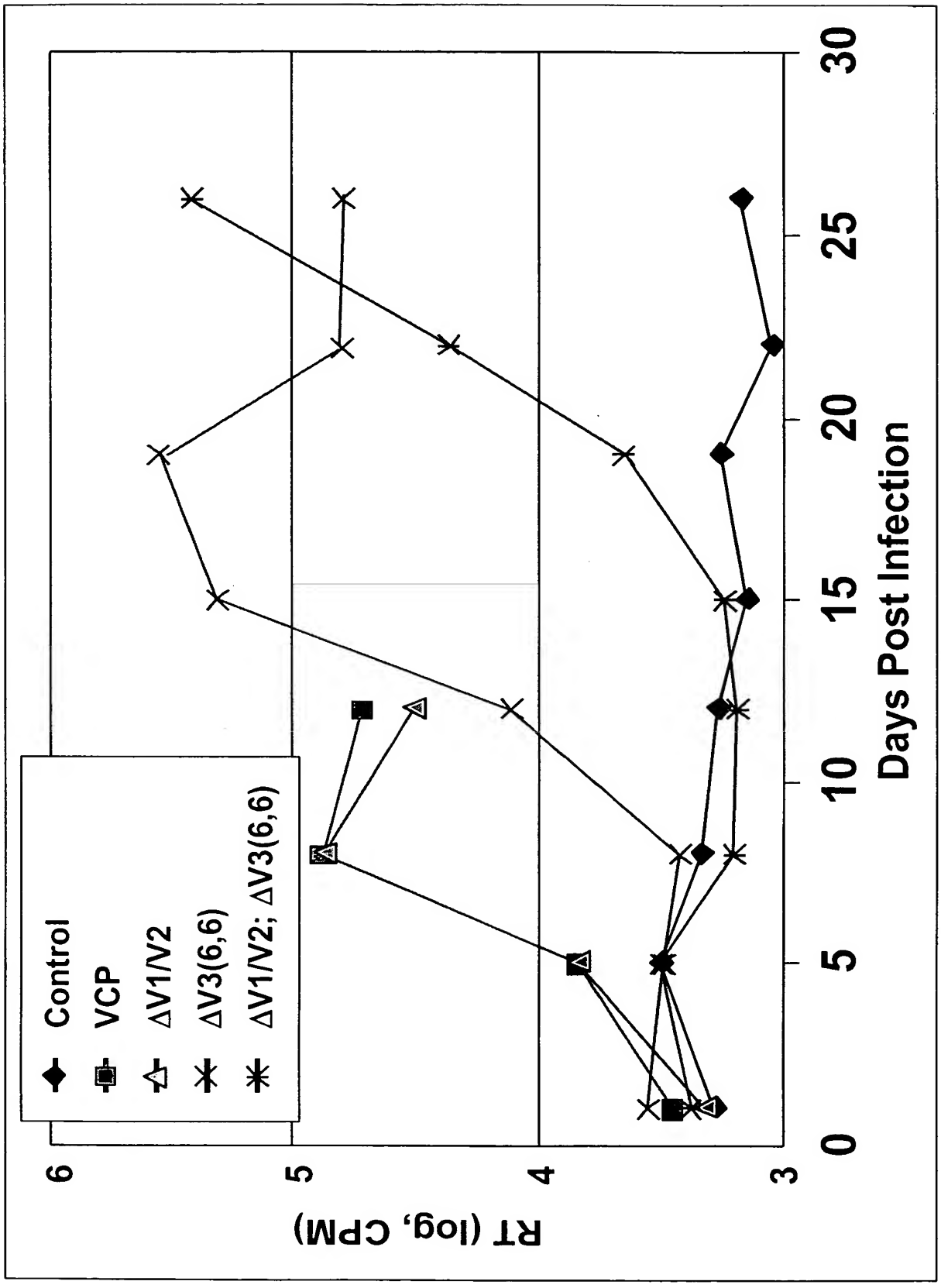
RT (log, CPM)
6
5
4
3
0
5
10
15
20
25
30
Days Post Infection
Control
VCP
ΔV1/V2
ΔV3(6,6)
ΔV1/V2; ΔV3(6,6)

FIG. 3A

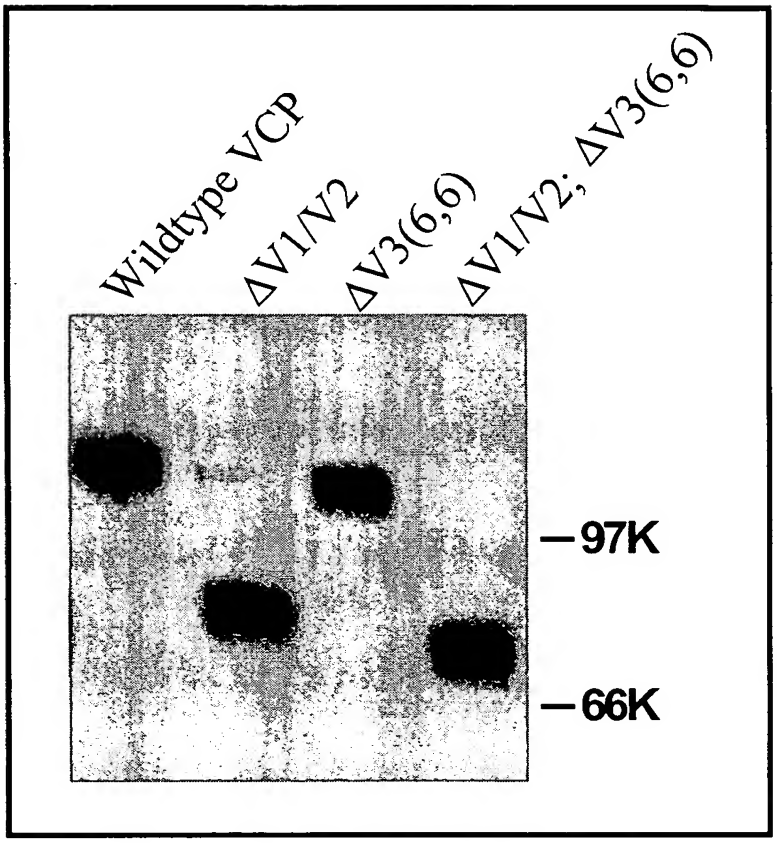

FIG. 3B

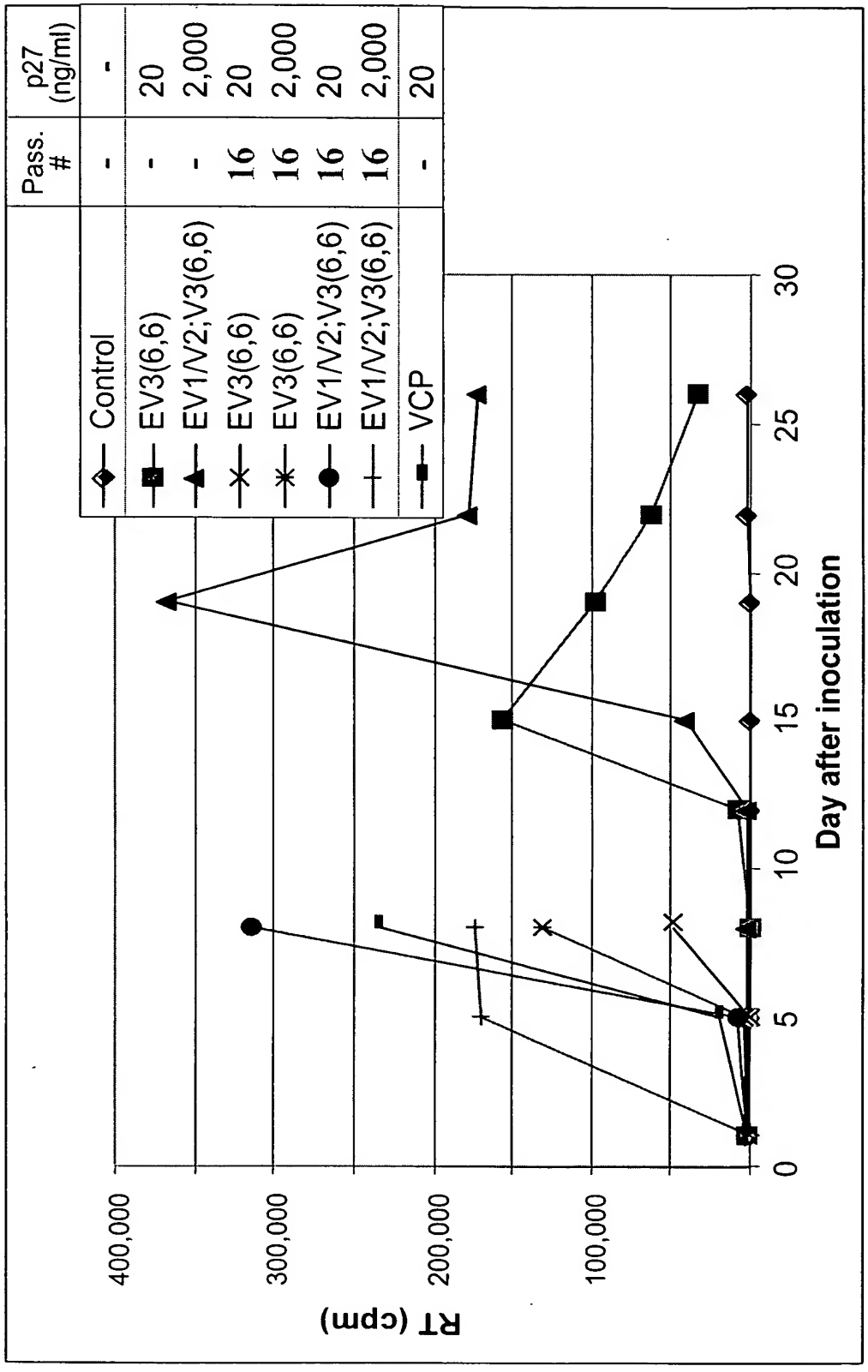
Pass. # | p27 (ng/ml)
Control | - | -
EV3(6,6) | - | 20
EV1/V2;V3(6,6) | - | 2,000
EV3(6,6) | 16 | 20
EV3(6,6) | 16 | 2,000
EV1/V2;V3(6,6) | 16 | 20
EV1/V2;V3(6,6) | 16 | 2,000
VCP | - | 20
RT (cpm)
400,000
300,000
200,000
100,000
0
5
10
15
20
25
30
Day after inoculation

FIG. 4

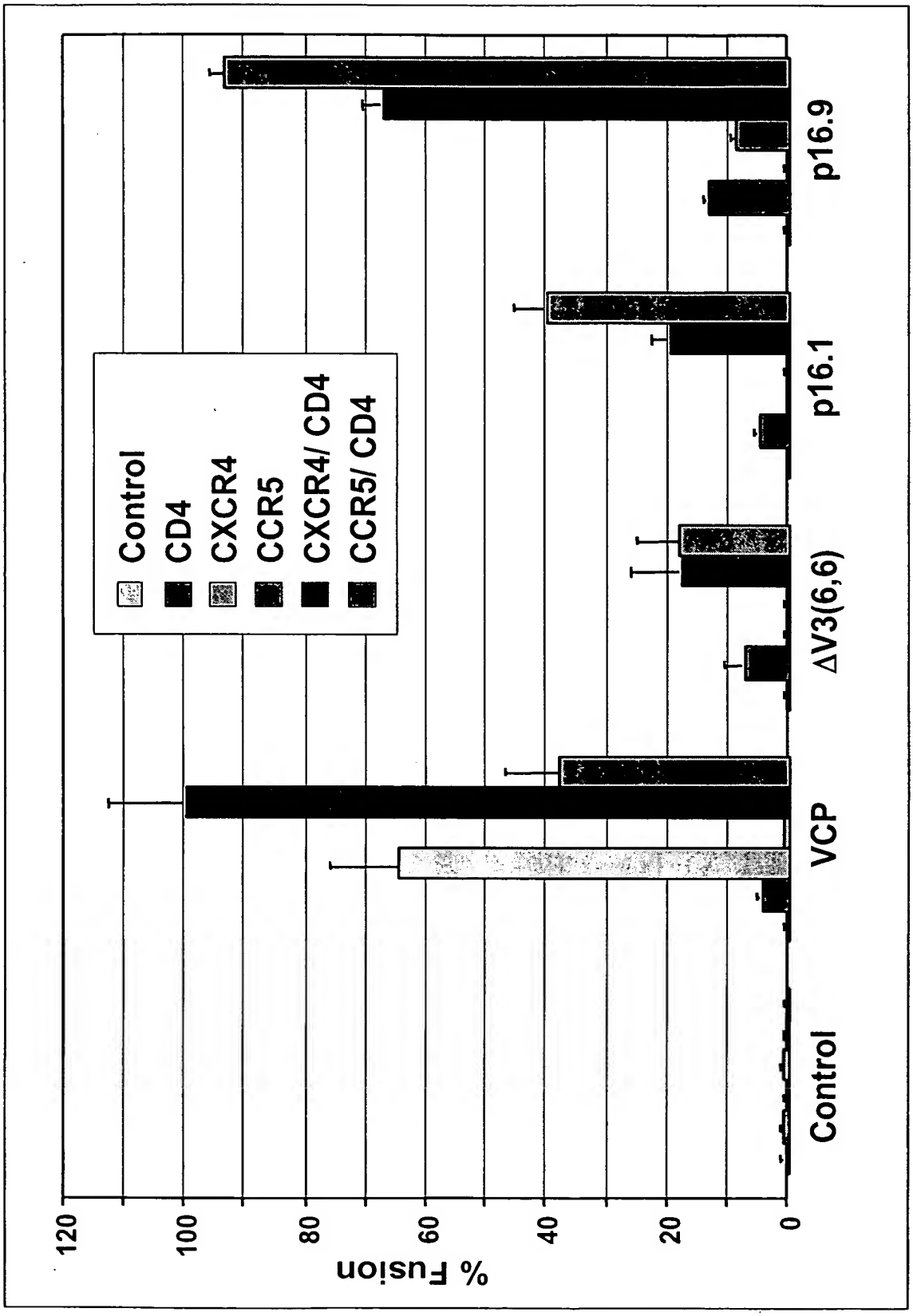
% Fusion
120
100
80
60
40
20
0
Control
VCP
ΔV3(6,6)
p16.1
p16.9
Control
CD4
CXCR4
CCR5
CXCR4/ CD4
CCR5/ CD4

FIG. 5A

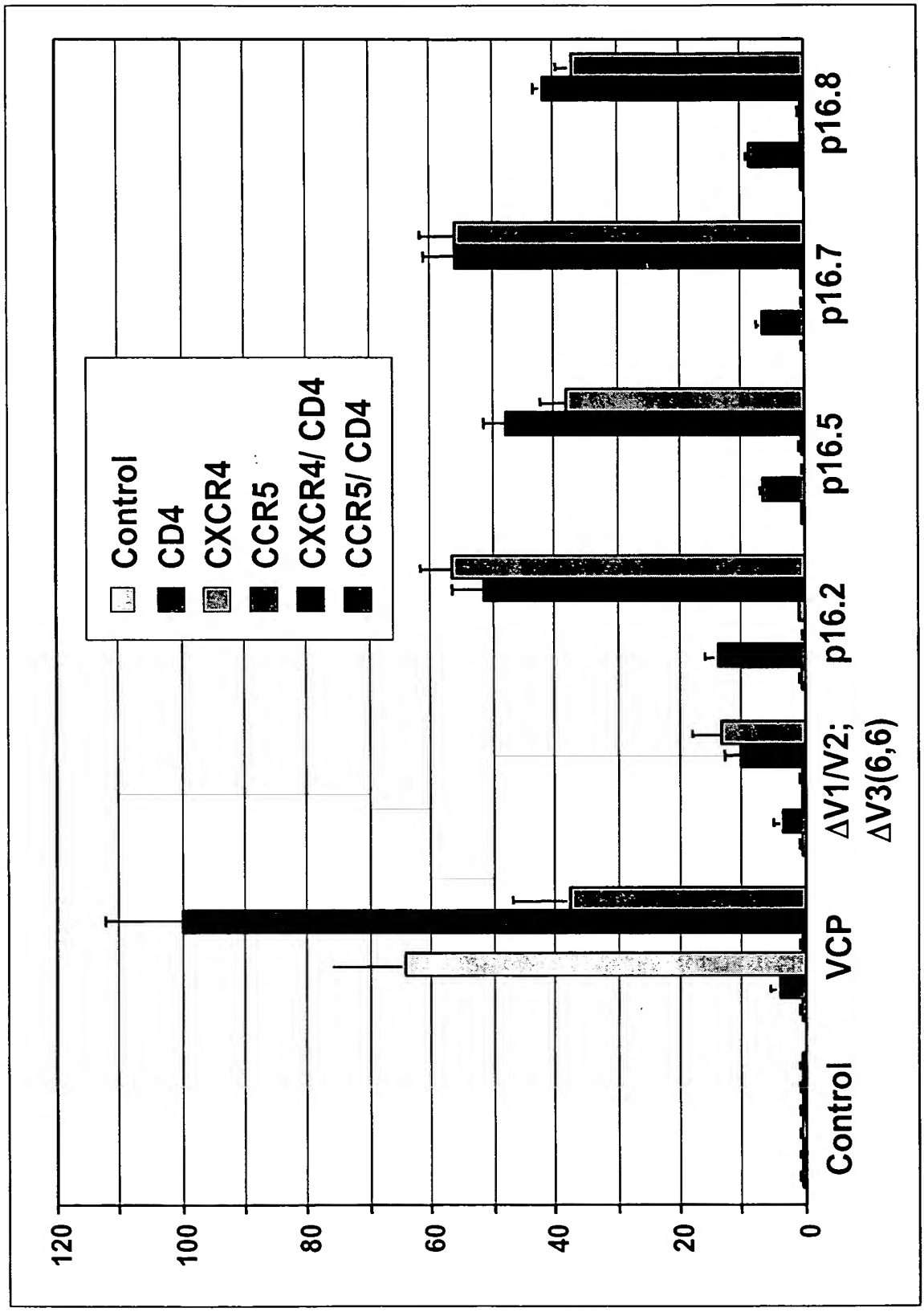
Control
CD4
CXCR4
CCR5
CXCR4/ CD4
CCR5/ CD4
120
100
80
60
40
20
0
Control
VCP
ΔV1/V2; ΔV3(6,6)
p16.2
p16.5
p16.7
p16.8

FIG. 5B

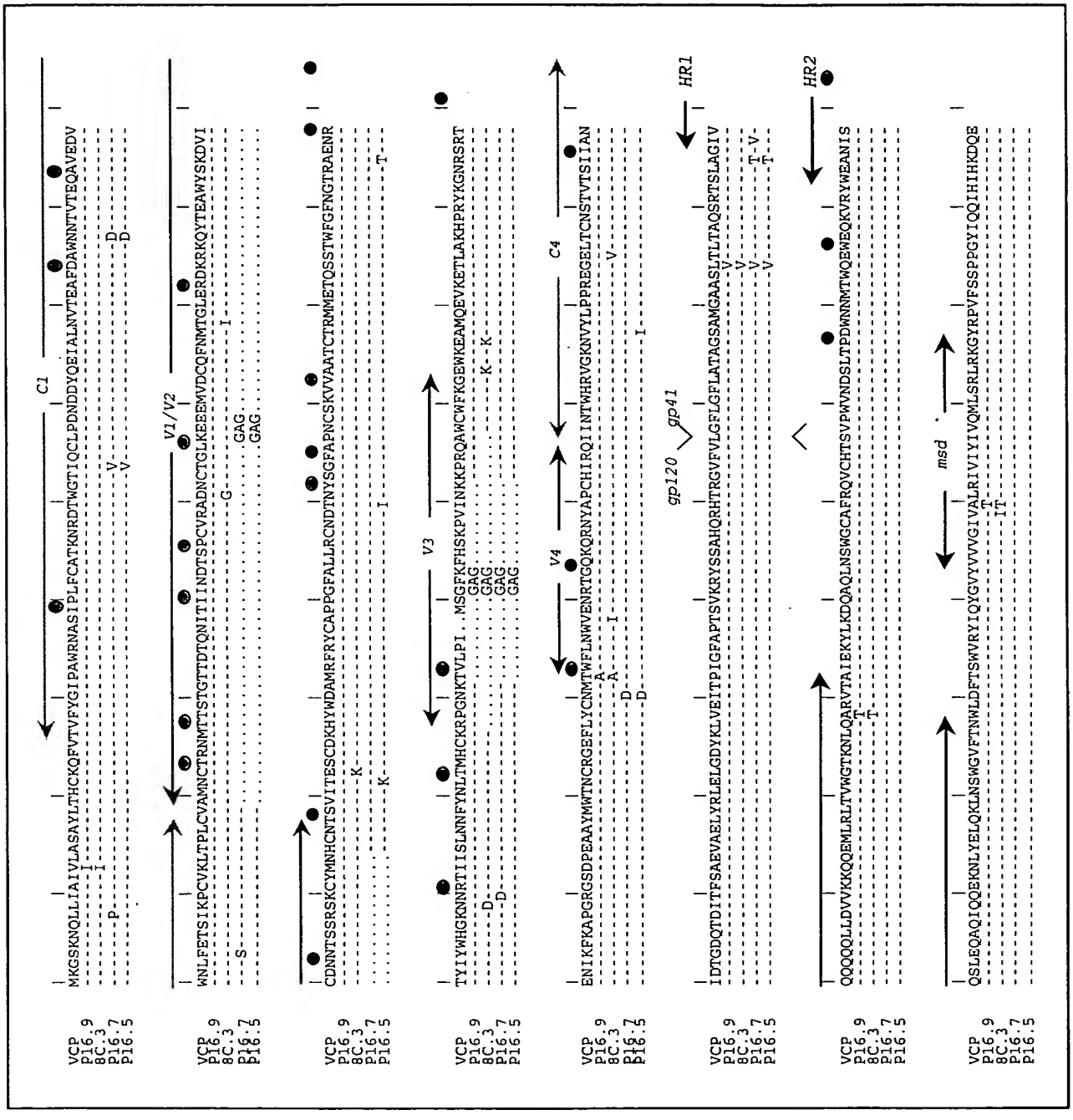

FIG. 6

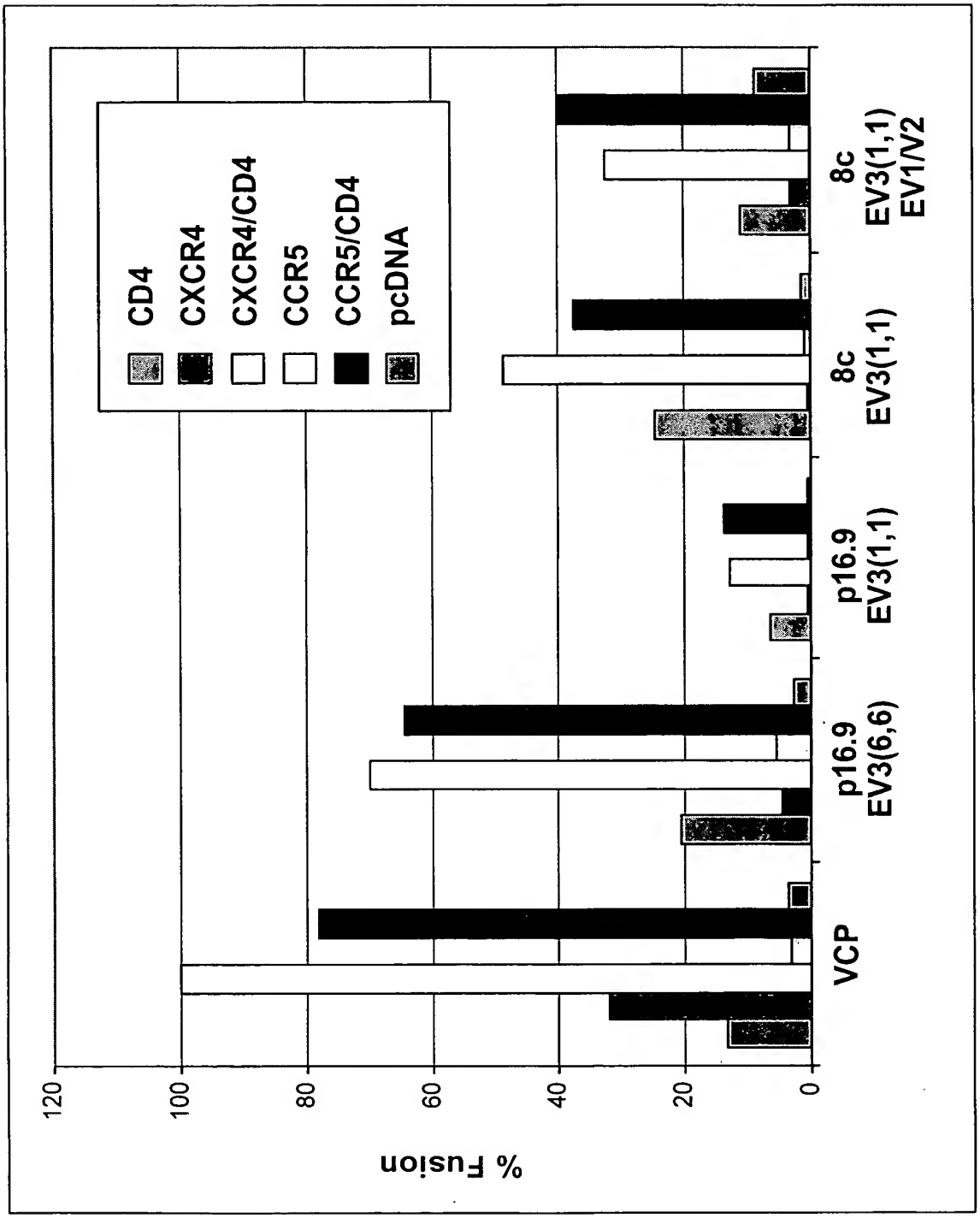
% Fusion
120
100
80
60
40
20
0
CD4
CXCR4
CXCR4/CD4
CCR5
CCR5/CD4
pcDNA
VCP
p16.9 EV3(6,6)
p16.9 EV3(1,1)
8c EV3(1,1)
8c EV3(1,1) EV1/V2

FIG. 7

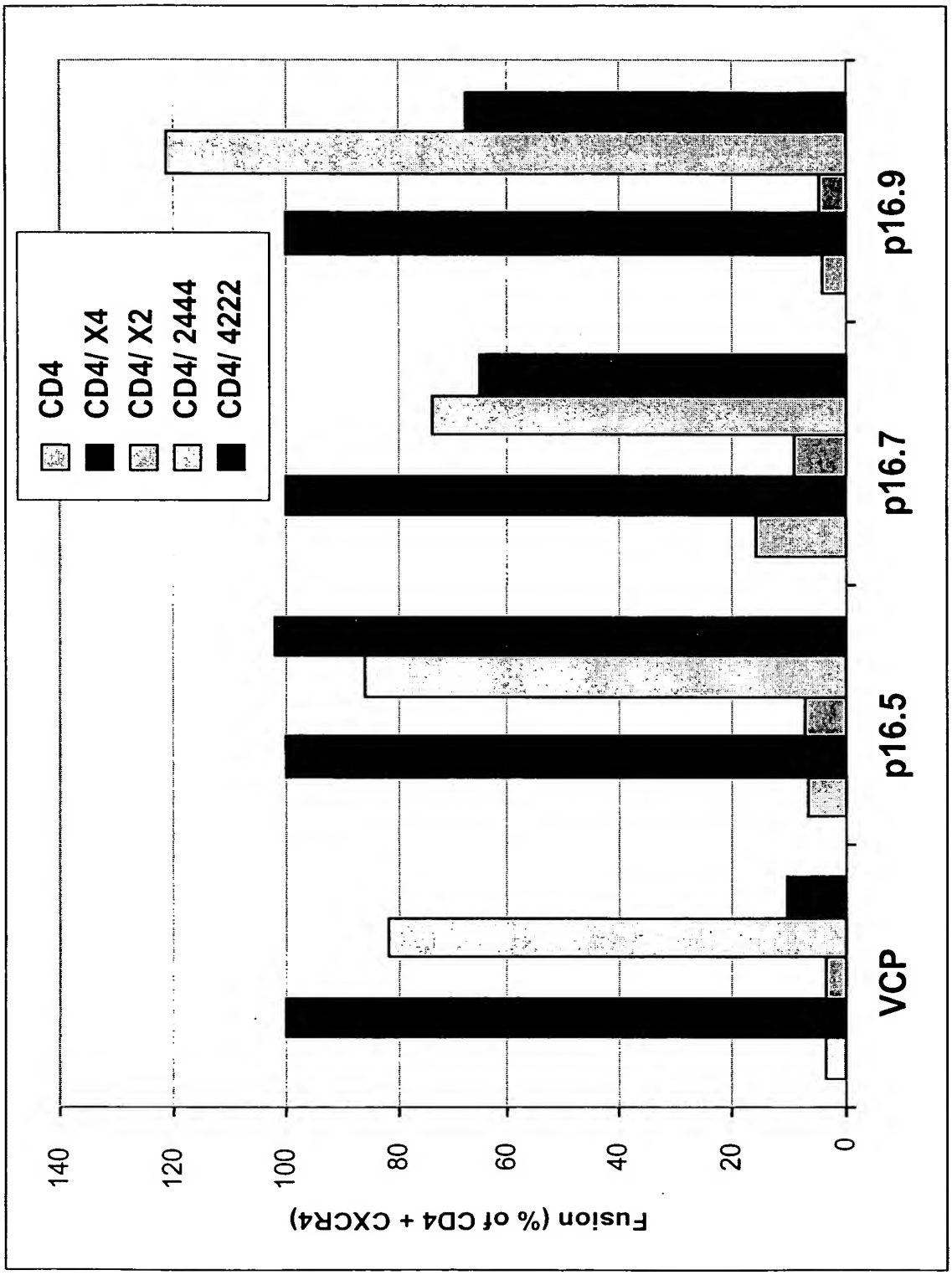
CD4
CD4/ X4
CD4/ X2
CD4/ 2444
CD4/ 4222
VCP
p16.5
p16.7
p16.9
0
20
40
60
80
100
120
140
Fusion (% of CD4 + CXCR4)

FIG. 8

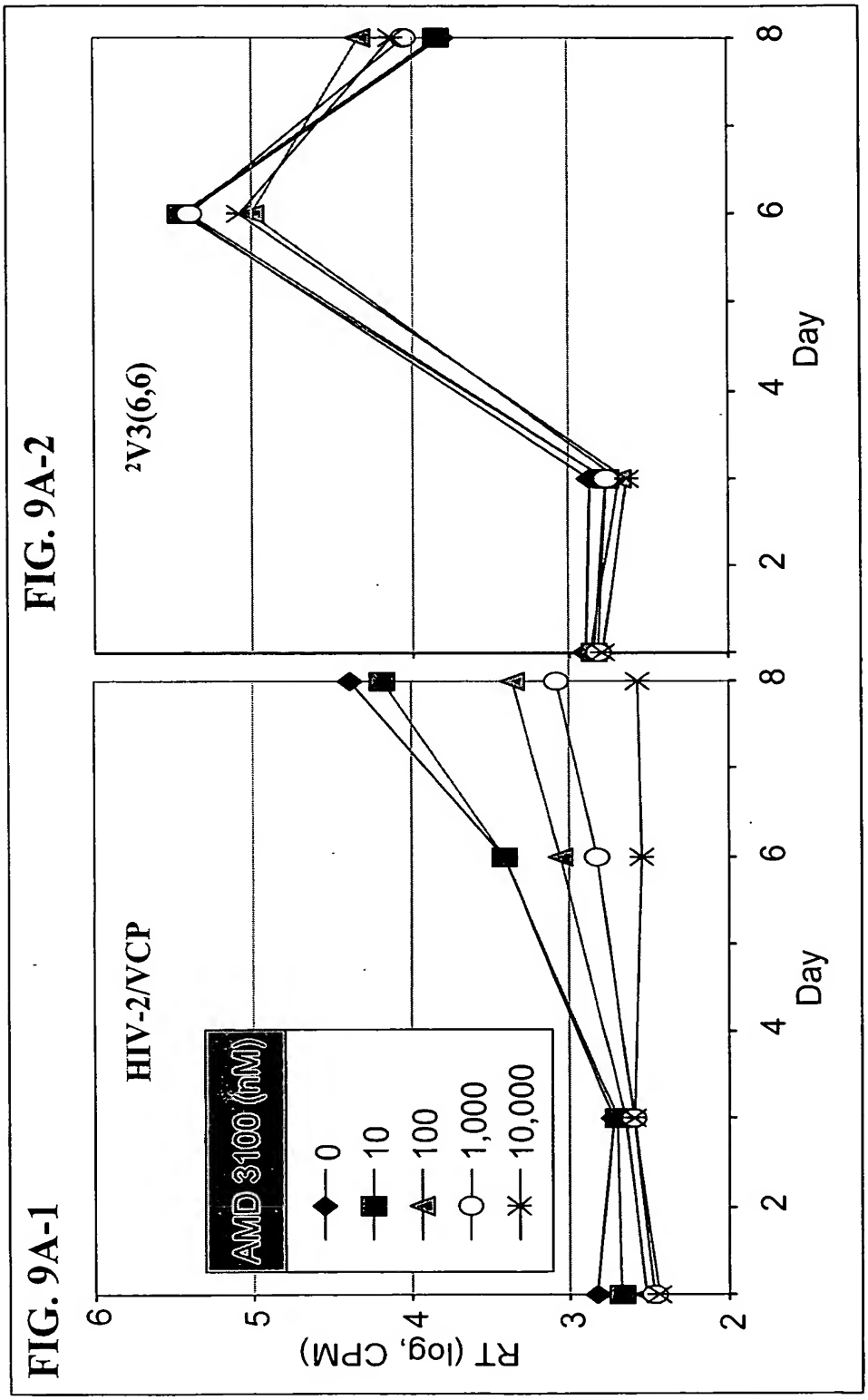
FIG. 9A-1
FIG. 9A-2
HIV-2/VCP
2V3(6,6)
RT (log, CPM)
Day
Day
AMD 3100 (nM)
0
10
100
1,000
10,000
2
3
4
5
6
2
4
6
8

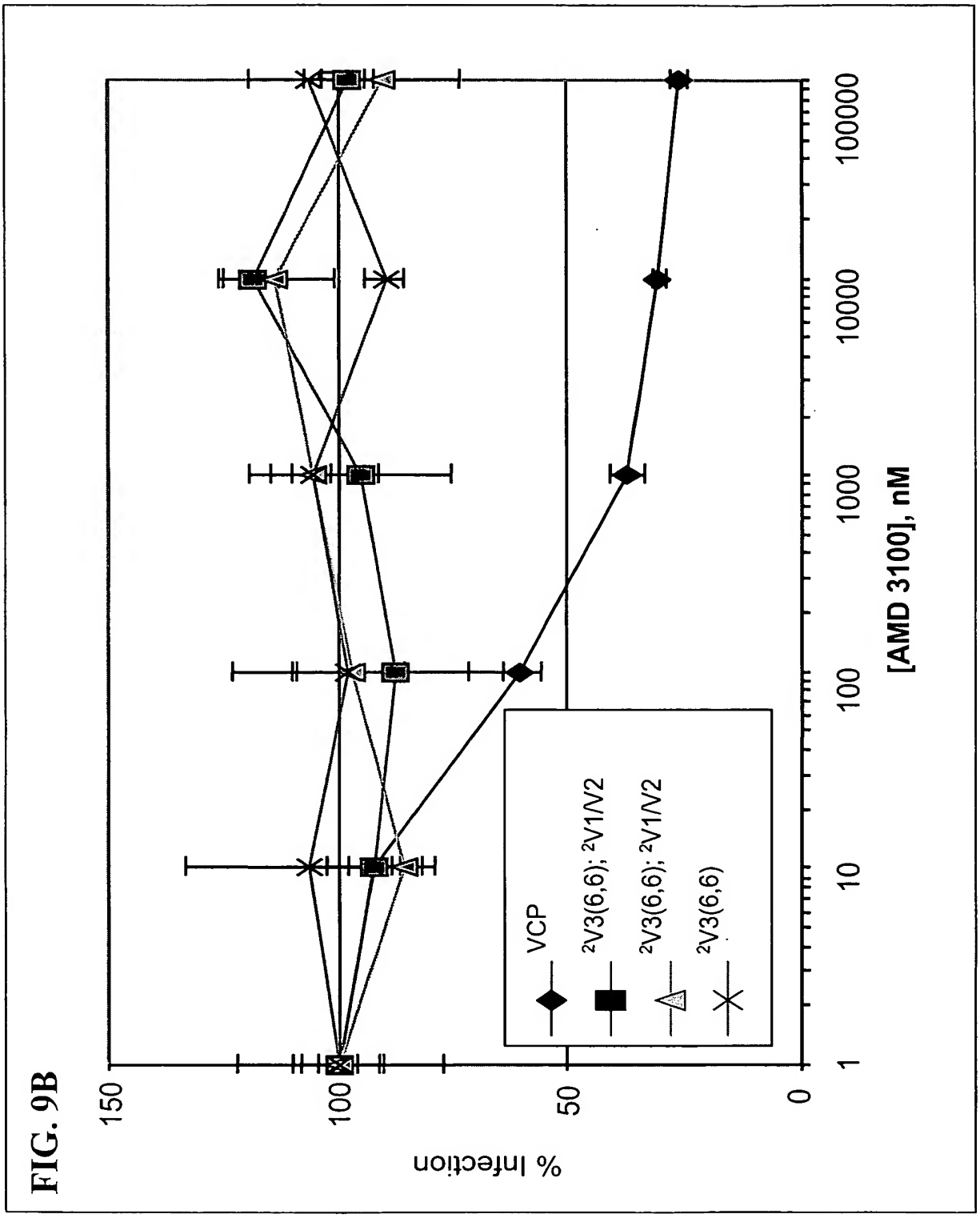
% Infection
150
100
50
0
1
10
100
1000
10000
100000
[AMD 3100], nM
VCP
²V3(6,6); ²V1/V2
²V3(6,6); ²V1/V2
²V3(6,6)

FIG. 9B

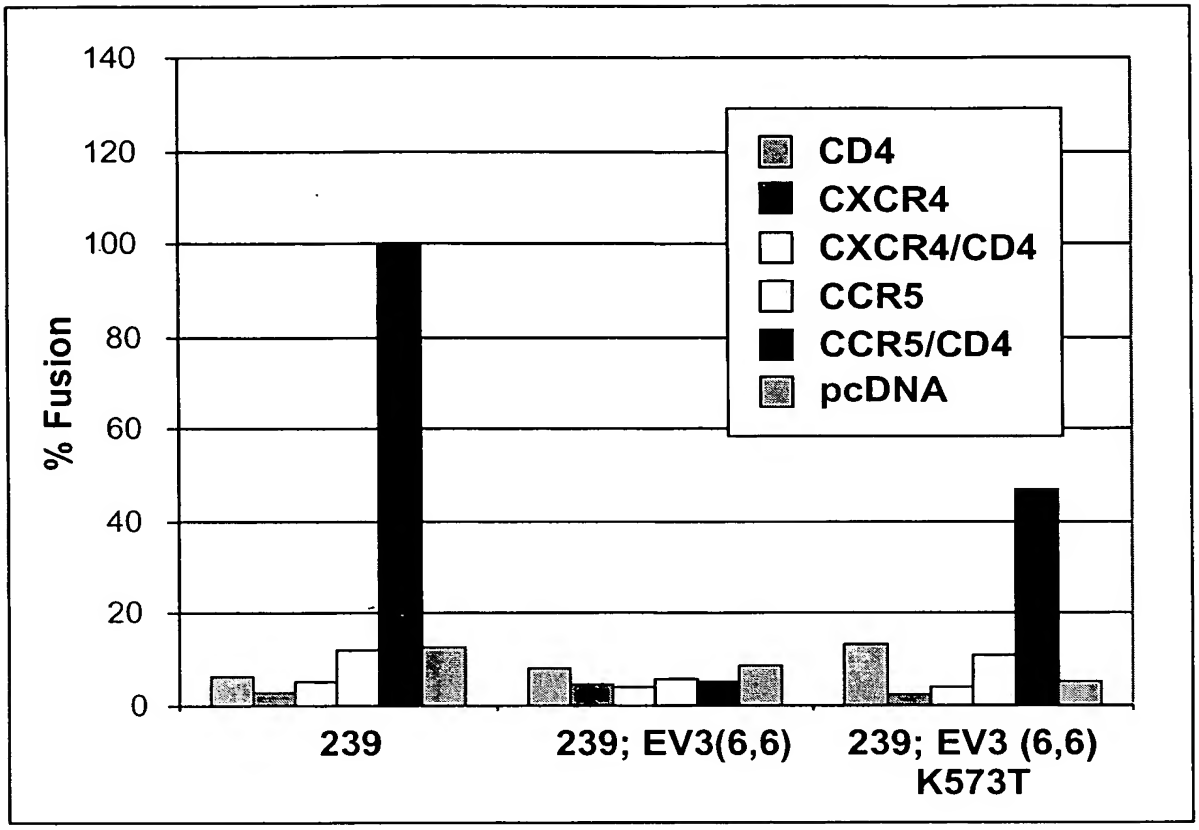
140
120
100
80
60
40
20
0
% Fusion
CD4
CXCR4
CXCR4/CD4
CCR5
CCR5/CD4
pcDNA
239
239; EV3(6,6)
239; EV3 (6,6) K573T

FIG. 10

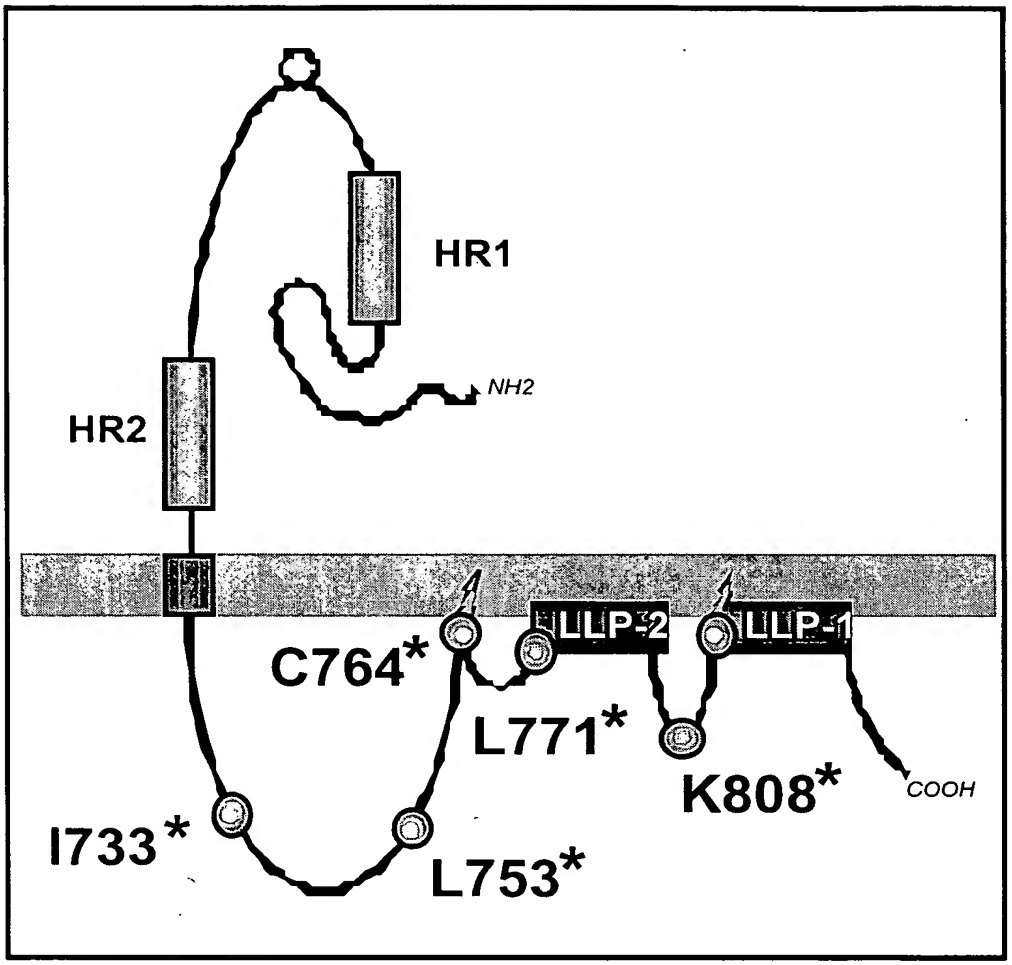

FIG. 11

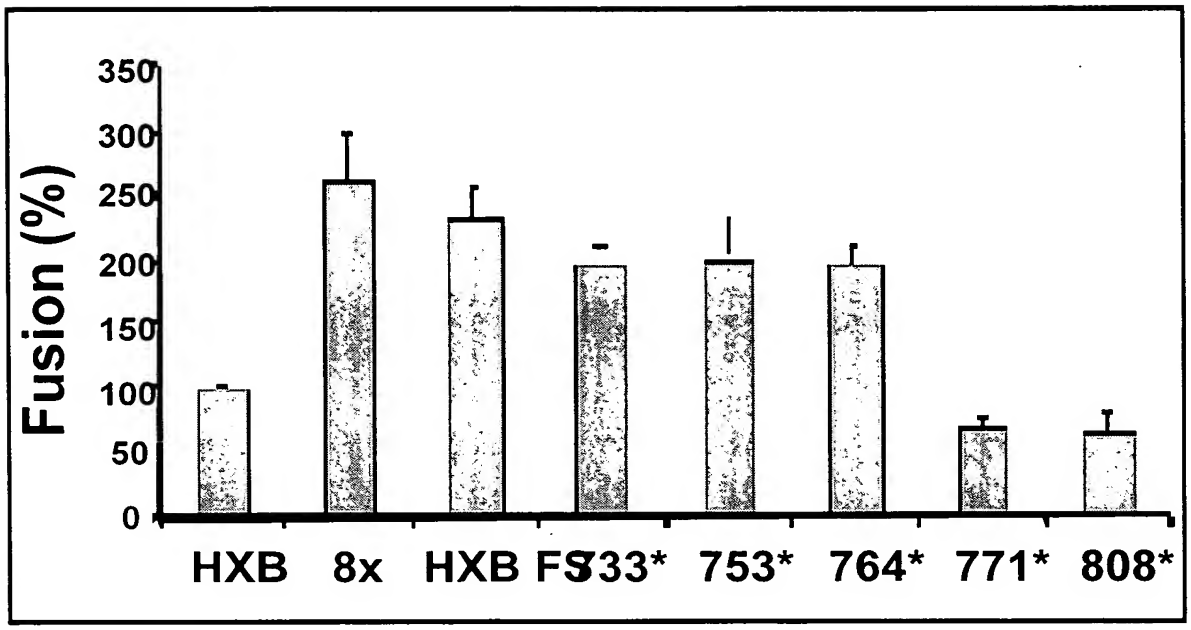
Fusion (%)
350
300
250
200
150
100
50
0
HXB
8x
HXB FS
733*
753*
764*
771*
808*

FIG. 12A

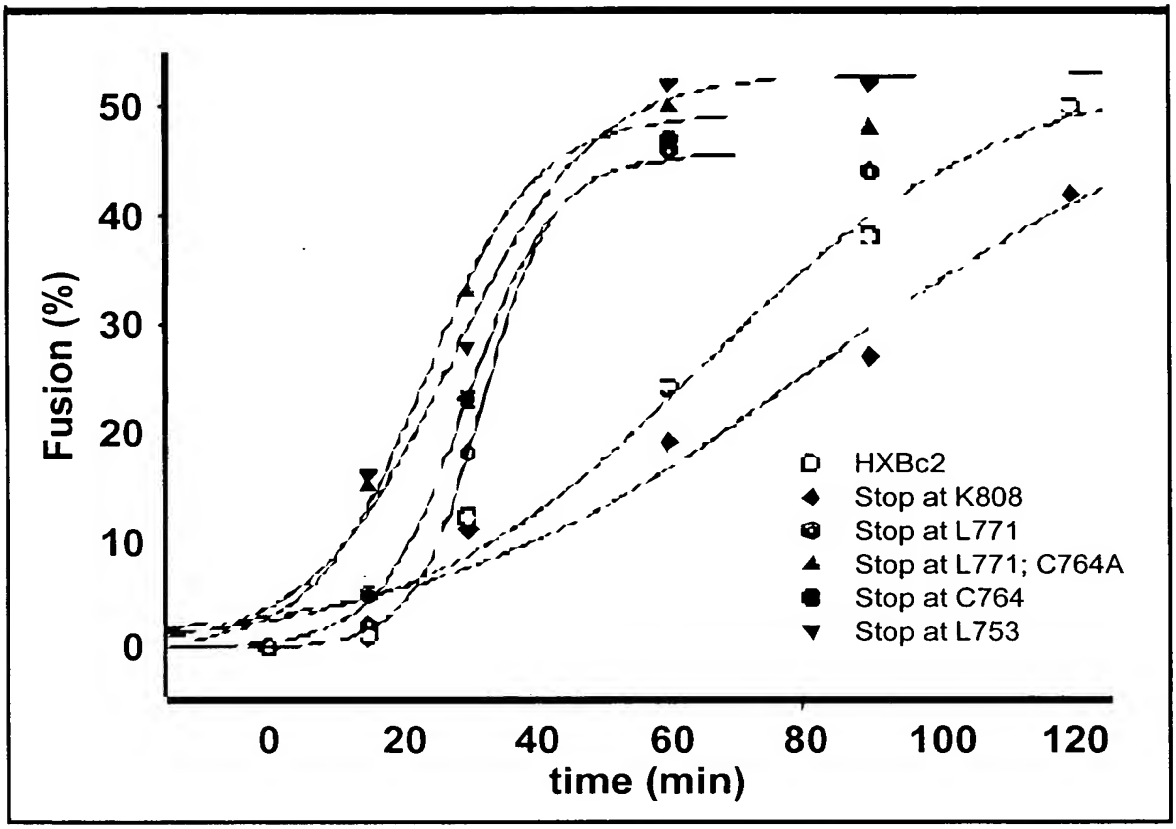
Fusion (%)
50
40
30
20
10
0
0
20
40
60
80
100
120
time (min)
HXBc2
Stop at K808
Stop at L771
Stop at L771; C764A
Stop at C764
Stop at L753

FIG. 12B

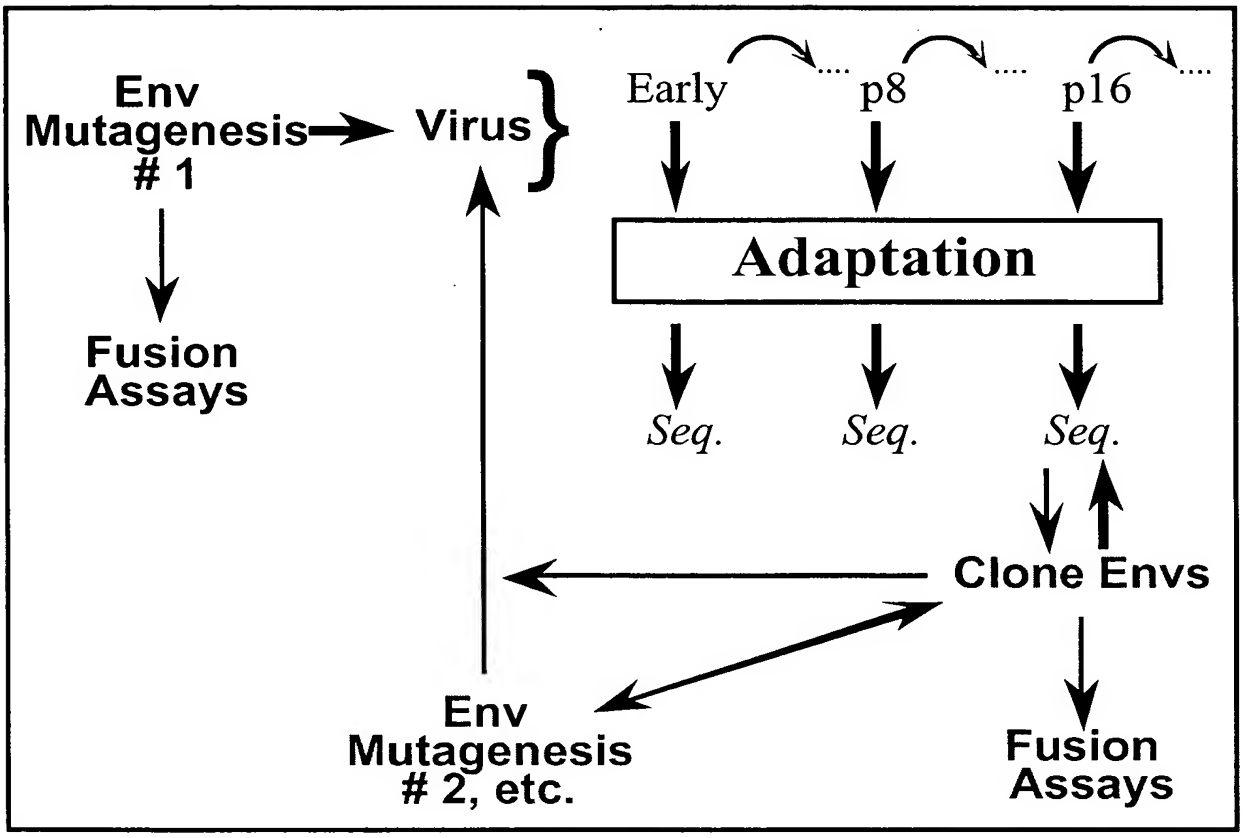
Env
Mutagenesis
1
Virus
Early
p8
p16
Adaptation
Fusion
Assays
Seq.
Seq.
Seq.
Clone Envs
Env
Mutagenesis
2, etc.
Fusion
Assays

FIG. 13

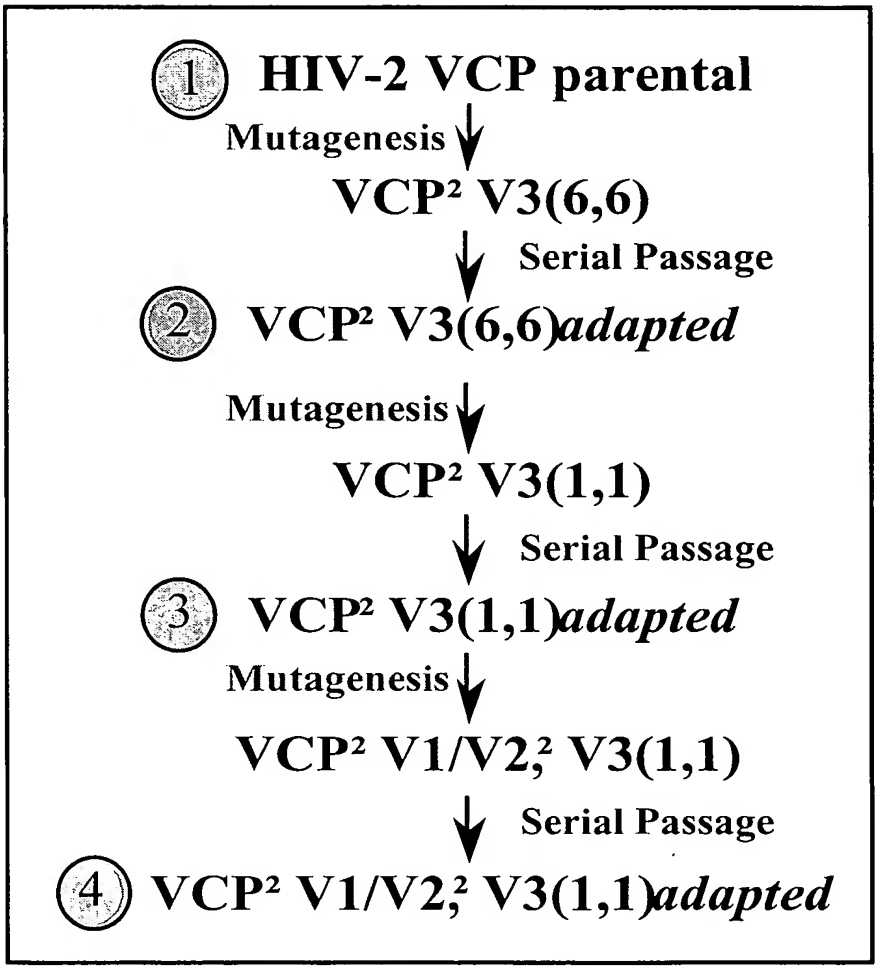
1 HIV-2 VCP parental
Mutagenesis
VCP² V3(6,6)
Serial Passage
2 VCP² V3(6,6)adapted
Mutagenesis
VCP² V3(1,1)
Serial Passage
3 VCP² V3(1,1)adapted
Mutagenesis
VCP² V1/V2,² V3(1,1)
Serial Passage
4 VCP² V1/V2,² V3(1,1)adapted

FIG. 14

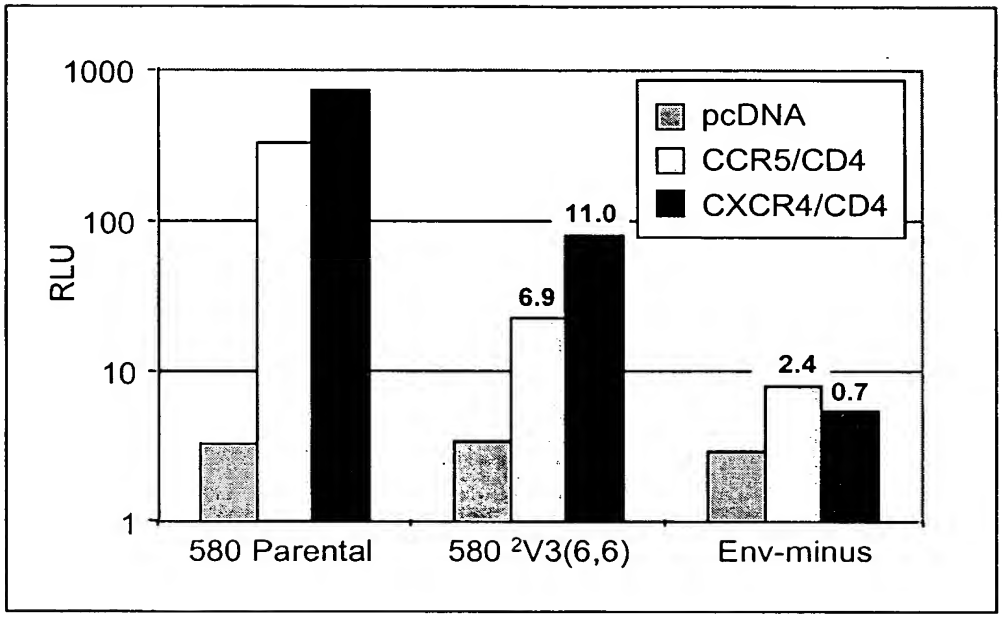
1000
100
10
1
RLU
pcDNA
CCR5/CD4
CXCR4/CD4
11.0
6.9
2.4
0.7
580 Parental
580 ²V3(6,6)
Env-minus

FIG. 15

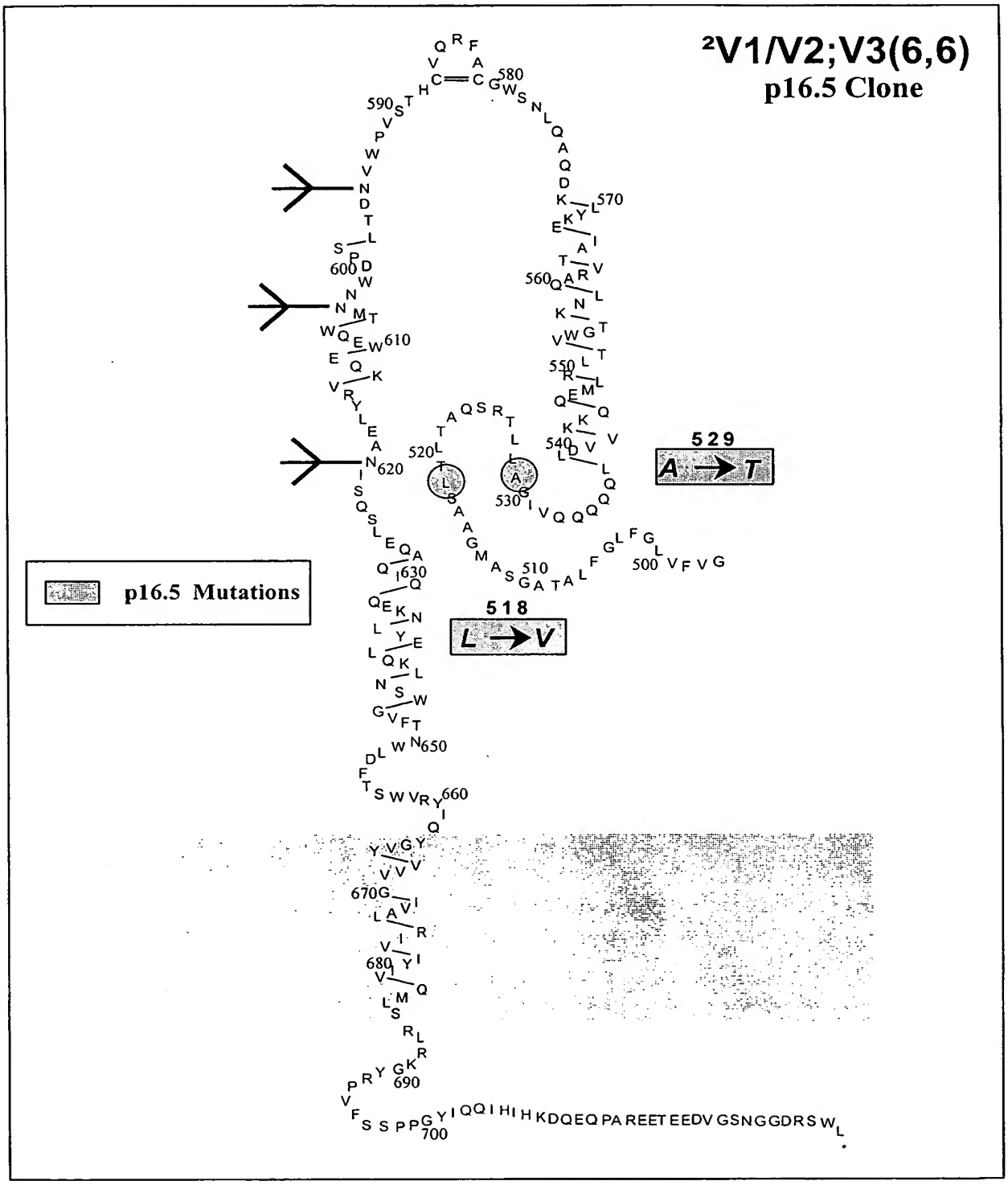

FIG. 16

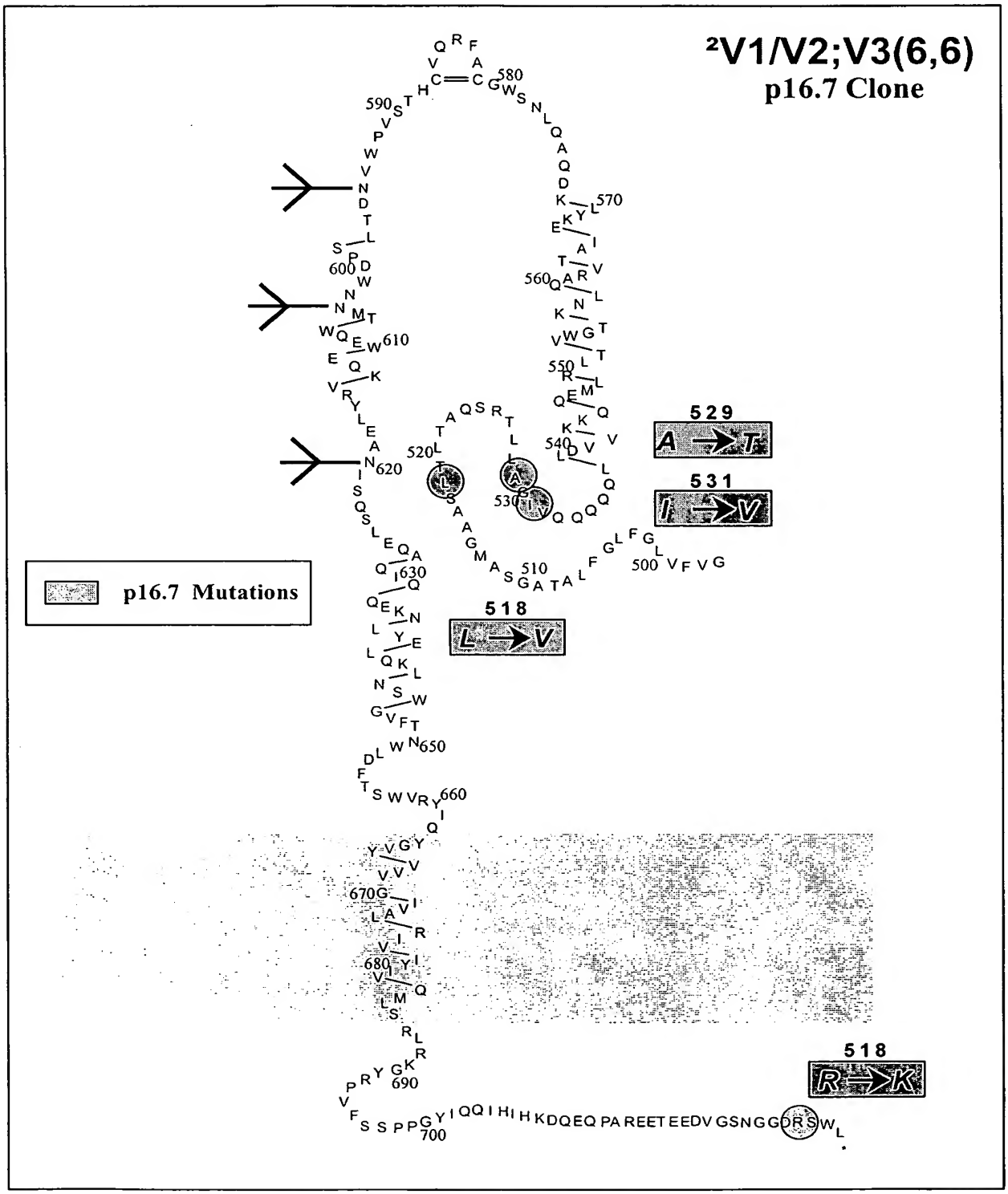
²V1/V2;V3(6,6)
p16.7 Clone
p16.7 Mutations
529
A → T
531
I → V
518
L → V
518
R → K

FIG. 17

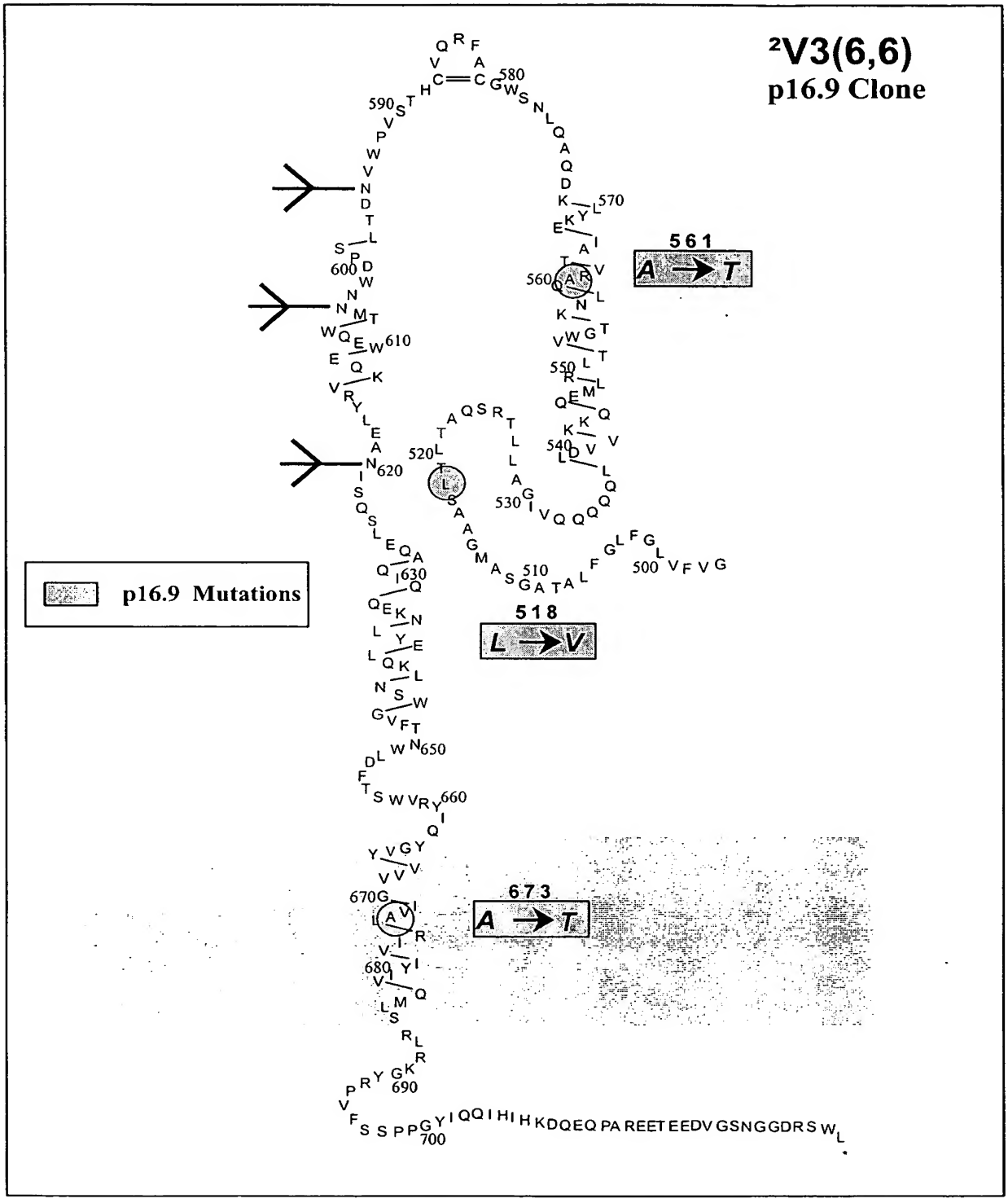

FIG. 18

FIG. 19A

MKGSKNQLLIAIILASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQCLPDND
DYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCTRNMTTSTGTT
DTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYTGTWYSKDVICDNNTS
SRSKCYMNHCNTSVITKSCDKHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATC
TRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIISLNNFYNLTMHCKGAGWCWFKGEWKE
AMQEVKETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCNMAWFLNWVD
NRTGRKQRNYAPCHIRQIINTWHRVGKNIYLPPREGELACNSTVTSIIANIDTGDQTDITFS
AEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTRGVFVLGFLGFLATAGSAMGAA
SVTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLTVWGTKNLQTRVTAIEKYLKDQAQLNS
WGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEANISQSLEQAQIQQEKNLYELQ
KLNSWGVFTNWLDFTSWVRYIQYGAYVVVGIVTLRIVIYIVQMLSRLRKGYRPVFSSPPGYI
QQIHIHKDQEQPAREETEEDVGSNGGDRSWL

FIG. 19B

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTATACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGATGCATGGAATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGCAATGAACTGTACAAGGAACATGACCACATCCACAGGGACCACA
GACACCCAAAATATCACAATTATAAATGACACTTCGCCATGCGTACGTGCAGACAACTGCAC
AGGATTAAAGGAGGAAGAAATGGTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACA
AGAGAAAACAGTATACTGGAACATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCA
AGTCGGAGCAAGTGTTACATGAACCATTGCAATACATCAGTCATCACAAAGTCATGTGATAA
GCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGAT
GCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACATGC
ACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGATTTAATGGCACTAGAGCAGAAAA
TAGAACATATATATATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTTTT
ATAATCTCACTATGCATTGTAAGGGTGCCGGCTGGTGTTGGTTCAAAGGCGAATGGAAGGAA
GCCATGCAGGAGGTGAAGGAGACCCTTGCGAAACATCCCAGATATAAAGGGAACAGGAGCCG
CACAGAGAATATTAAATTTAAAGCACCAGGAAGAGGCTCAGACCCAGAAGCAGCATACATGT
GGACTAACTGCAGAGGGGAATTTCTCTACTGCAACATGGCTTGGTTCCTCAACTGGGTAGAT
AACAGGACGGGTCGGAAACAGCGCAATTATGCACCGTGCCATATAAGGCAAATAATTAATAC
TTGGCACAGGGTAGGGAAAAACATATATTTGCCTCCCAGGGAAGGGGAGTTGGCCTGCAACT
CAACAGTGACCAGCATAATTGCCAACATTGATACGGGAGATCAAACAGATATTACCTTTAGT
GCAGAGGTGGCAGAACTATACCGATTGGAATTGGGAGATTACAAATTAGTAGAAATCACACC
AATTGGCTTCGCACCTACATCAGTAAAGAGATACTCCTCTGCTCACCAGAGACATACAAGAG
GTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGCGCGGCG
TCGGTGACGCTGACCGCCCAGTCCCGGACTTCATTGGCTGGGATAGTGCAGCAACAGCAACA
GCTGTTGGACGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAAA
ATCTCCAGACAAGAGTCACTGCTATAGAGAAATACCTAAAGGACCAGGCGCAGTTAAATTCA
TGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGAC
ACCTGATTGGAACAATATGACGTGGCAGGAATGGGAACAGAAAGTCCGCTACTGGGAGGCAA
ATATCAGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCAA
AAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATAT
TCAATATGGAGCATATGTAGTAGTAGGAATAGTAACTTTAAGAATAGTAATATATATAGTAC
AGATGTTAAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATATC
CAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACGT
TGGAAGCAACGGTGGAGACAGATCTTGGCTTTAG

FIG. 19C

MKGSKNQLLIAIILASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQCLPDND
DYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCTRNMTTSTGTT
DTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYTGTWYSKDVICDNNTS
SRSKCYMNHCNTSVITKSCDKHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATC
TRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIISLNNFYNLTMHCKGAGWCWFKGEWKE
AMQEVKETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCNMAWFLNWVD
NRTGRKQRNYAPCHIRQIINTWHRVGKNIYLPPREGELACNSTVTSIIANIDTGDQTDITFS
AEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTR

FIG. 19D

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTATACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGATGCATGGAATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGCAATGAACTGTACAAGGAACATGACCACATCCACAGGGACCACA
GACACCCAAAATATCACAATTATAAATGACACTTCGCCATGCGTACGTGCAGACAACTGCAC
AGGATTAAAGGAGGAAGAAATGGTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACA
AGAGAAAACAGTATACTGGAACATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCA
AGTCGGAGCAAGTGTTACATGAACCATTGCAATACATCAGTCATCACAAAGTCATGTGATAA
GCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGAT
GCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACATGC
ACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGATTTAATGGCACTAGAGCAGAAAA
TAGAACATATATATATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTTTT
ATAATCTCACTATGCATTGTAAGGGTGCCGGCTGGTGTTGGTTCAAAGGCGAATGGAAGGAA
GCCATGCAGGAGGTGAAGGAGACCCTTGCGAAACATCCCAGATATAAAGGGAACAGGAGCCG
CACAGAGAATATTAAATTTAAAGCACCAGGAAGAGGCTCAGACCCAGAAGCAGCATACATGT
GGACTAACTGCAGAGGGGAATTTCTCTACTGCAACATGGCTTGGTTCCTCAACTGGGTAGAT
AACAGGACGGGTCGGAAACAGCGCAATTATGCACCGTGCCATATAAGGCAAATAATTAATAC
TTGGCACAGGGTAGGGAAAAACATATATTTGCCTCCCAGGGAAGGGGAGTTGGCCTGCAACT
CAACAGTGACCAGCATAATTGCCAACATTGATACGGGAGATCAAACAGATATTACCTTTAGT
GCAGAGGTGGCAGAACTATACCGATTGGAATTGGGAGATTACAAATTAGTAGAAATCACACC
AATTGGCTTCGCACCTACATCAGTAAAGAGATACTCCTCTGCTCACCAGAGACATACAAGA

FIG. 19E

GVFVLGFLGFLATAGSAMGAASVTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLTVWGTK
NLQTRVTAIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEA
NISQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGAYVVVGIVTLRIVIYIV
QMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDRSWL

FIG. 19F

GGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGCGCGGC
GTCGGTGACGCTGACCGCCCAGTCCCGGACTTCATTGGCTGGGATAGTGCAGCAACAGCAAC
AGCTGTTGGACGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAA
AATCTCCAGACAAGAGTCACTGCTATAGAGAAATACCTAAAGGACCAGGCGCAGTTAAATTC
ATGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGA
CACCTGATTGGAACAATATGACGTGGCAGGAATGGGAACAGAAAGTCCGCTACTGGGAGGCA
AATATCAGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCA
AAAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATA
TTCAATATGGAGCATATGTAGTAGTAGGAATAGTAACTTTAAGAATAGTAATATATATAGTA
CAGATGTTAAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATAT
CCAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACG
TTGGAAGCAACGGTGGAGACAGATCTTGGCTTTAG

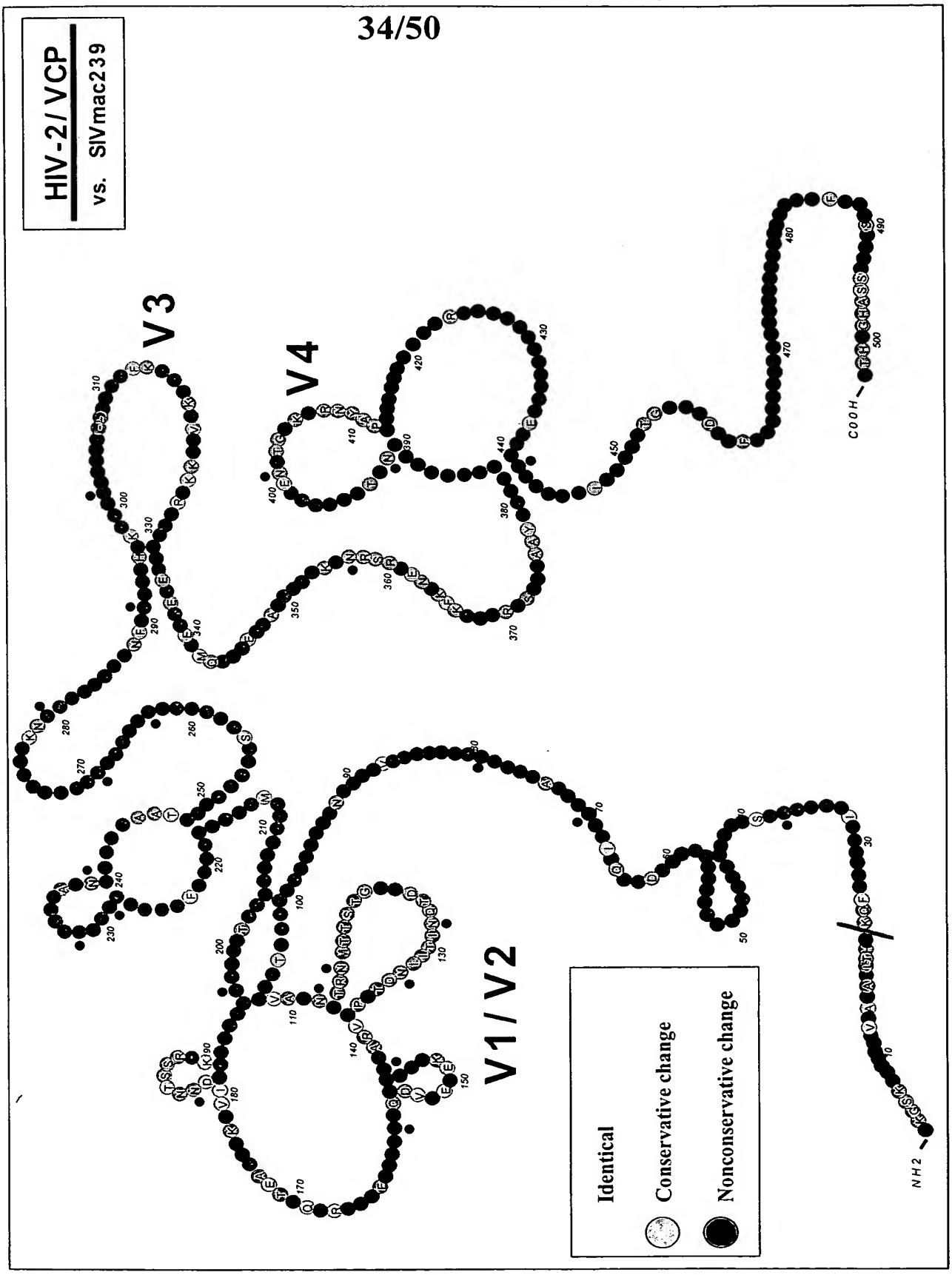
HIV-2/VCP
vs. SIVmac239
V3
V4
V1/V2
COOH
NH2
Identical
Conservative change
Nonconservative change

FIG. 20

FIG. 21A

MKGSKNQLLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQC
LPDNDDYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCT
RNMTTSTGTTDTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYT
EAWYSKDVICDNNTSSRSKCYMNHCNTSVITESCDKHYWDAMRFRYCAPPGFALLRC
NDTNYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIIS
LNNFYNLTMHCKRPGNKTVLPIMSGFKFHSKPVINKKPRQAWCWFKGEWKEAMQEVK
ETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCNMTWFLNWVDN
RTGQKQRNYAPCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTD
ITFSAEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTRGVFVLGFLGFLA
TAGSAMGAASLTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLTVWGTKNLQARVT
AIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEANI
SQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVYVVVGIVALRIVI
YIVQMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDRSWL

FIG. 21B

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTGTACTAGCTAGTGCTTACCTA
ACACATTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCA
TCCATTCCCCTGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGC
TTGCCAGACAATGATGATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGAT
GCATGGAATAATACAGTAACAGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAG
ACATCAATAAAACCATGTGTCAAATTAACACCCTTATGTGTAGCAATGAACTGTACA
AGGAACATGACCACATCCACAGGGACCACAGACACCCAAAATATCACAATTATAAAT
GACACTTCGCCATGCGTACGTGCAGACAACTGCACAGGATTAAAGGAGGAAGAAATG
GTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACAAGAGAAAACAGTATACT
GAAGCATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCAAGTCGGAGCAAG
TGTTACATGAACCATTGCAATACATCAGTCATCACAGAGTCATGTGATAAGCACTAT
TGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGATGC
AATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACA
TGCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGA
GCAGAAAATAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGC
TTAAATAACTTTTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGACAGTG
TTACCAATAATGTCAGGGTTTAAGTTTCACTCCAAGCCGGTCATCAATAAAAAACCC
AGGCAAGCATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAG
GAGACCCTTGCGAAACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATT
AAATTTAAAGCACCAGGAAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAAC
TGCAGAGGGGAATTTCTCTACTGCAACATGACTTGGTTCCTCAATTGGGTAGATAAC
AGGACGGGTCAGAAACAGCGCAATTATGCACCGTGCCATATAAGGCAAATAATTAAT
ACTTGGCACAGGGTAGGGAAAAACGTATATTTGCCTCCCAGGGAAGGGGAGTTGACC
TGCAACTCAACAGTGACCAGCATAATTGCCAACATTGATACGGGAGATCAAACAGAT
ATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAATTGGGAGATTACAAA
TTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAGATACTCCTCT
GCTCACCAGAGACATACAAGAGGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCA
ACGGCAGGTTCTGCAATGGGCGCGGCGTCGTTGACGCTGACCGCTCAGTCCCGGACT
TCATTGGCTGGGATAGTGCAGCAACAGCAACAGCTGTTGGATGTGGTCAAGAAACAA
CAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAAAATCTCCAGGCAAGAGTCACT
GCTATAGAGAAATACCTAAAGGACCAGGCGCAGCTAAATTCATGGGGATGTGCGTTT
AGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGACACCTGATTGG
AACAATATGACGTGGCAGGAATGGGAACAAAAAGTCCGCTACTGGGAGGCAAATATC
AGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCAA
AAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGG
TATATTCAATATGGAGTTTATGTAGTAGTAGGAATAGTAGCTTTAAGAATAGTAATA
TATATAGTACAGATGTTAAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCC
CCCCCCGGTTATATCCAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGA
GAAGAAACAGAAGAAGACGTTGGAAGCAACGGTGGAGACAGATCTTGGCTTTAGCCG
ATAGCATATATTCATTTCCTGATCCGCCTGCTGATTCGCCTCTTGATCGGGCTATAC
AACATCTGCAGAGACTTACTATCCAGGATCTCCCCGATCCTCCAACCAATCTTCCAG
AGTCTCCAGAGAGCACTAACAGCAATCAGAGACTGGCTGAGGCTTAAAGCAGCCTAC
CTGCAGTATGGGTGCGAGTGGATCCAAGAAGCGTTCCAAGCCCTTGCAAGGACTACA
AGAGAGACTCTTGCAGGCGCGGGG

FIG. 21C

MKGSKNQLLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQC
LPDNDDYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCT
RNMTTSTGTTDTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYT
EAWYSKDVICDNNTSSRSKCYMNHCNTSVITESCDKHYWDAMRFRYCAPPGFALLRC
NDTNYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIIS
LNNFYNLTMHCKRPGNKTVLPIMSGFKFHSKPVINKKPRQAWCWFKGEWKEAMQEVK
ETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCNMTWFLNWVDN
RTGQKQRNYAPCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTD
ITFSAEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTR

FIG. 21D

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTGTACTAGCTAGTGCTTACCTA
ACACATTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCA
TCCATTCCCCTGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGC
TTGCCAGACAATGATGATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGAT
GCATGGAATAATACAGTAACAGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAG
ACATCAATAAAACCATGTGTCAAATTAACACCCTTATGTGTAGCAATGAACTGTACA
AGGAACATGACCACATCCACAGGGACCACAGACACCCAAAATATCACAATTATAAAT
GACACTTCGCCATGCGTACGTGCAGACAACTGCACAGGATTAAAGGAGGAAGAAATG
GTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACAAGAGAAAACAGTATACT
GAAGCATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCAAGTCGGAGCAAG
TGTTACATGAACCATTGCAATACATCAGTCATCACAGAGTCATGTGATAAGCACTAT
TGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGATGC
AATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACA
TGCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGA
GCAGAAAATAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGC
TTAAATAACTTTTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGACAGTG
TTACCAATAATGTCAGGGTTTAAGTTTCACTCCAAGCCGGTCATCAATAAAAAACCC
AGGCAAGCATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAG
GAGACCCTTGCGAAACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATT
AAATTTAAAGCACCAGGAAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAAC
TGCAGAGGGGAATTTCTCTACTGCAACATGACTTGGTTCCTCAATTGGGTAGATAAC
AGGACGGGTCAGAAACAGCGCAATTATGCACCGTGCCATATAAGGCAAATAATTAAT
ACTTGGCACAGGGTAGGGAAAAACGTATATTTGCCTCCCAGGGAAGGGGAGTTGACC
TGCAACTCAACAGTGACCAGCATAATTGCCAACATTGATACGGGAGATCAAACAGAT
ATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAATTGGGAGATTACAAA
TTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAGATACTCCTCT
GCTCACCAGAGACATACAAGA

FIG. 21E

GVFVLGFLGFLATAGSAMGAASLTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLT
VWGTKNLQARVTAIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQE
WEQKVRYWEANISQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVY
VVVGIVALRIVIYIVQMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDV
GSNGGDRSWL*PIAYIHFLIRLLIRLLIGLYNICRDLLSRISPILQPIFQSLQRALT
AIRDWLRLKAAYLQYGCEWIQEAFQALARTTRETLAGAG

FIG. 21F

GGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGC
GCGGCGTCGTTGACGCTGACCGCTCAGTCCCGGACTTCATTGGCTGGGATAGTGCAG
CAACAGCAACAGCTGTTGGATGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACC
GTCTGGGGAACTAAAAATCTCCAGGCAAGAGTCACTGCTATAGAGAAATACCTAAAG
GACCAGGCGCAGCTAAATTCATGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCT
GTACCATGGGTAAATGATAGCTTGACACCTGATTGGAACAATATGACGTGGCAGGAA
TGGGAACAAAAAGTCCGCTACTGGGAGGCAAATATCAGTCAAAGTCTAGAACAAGCA
CAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCAAAAATTAAATAGCTGGGGTGTT
TTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATATTCAATATGGAGTTTAT
GTAGTAGTAGGAATAGTAGCTTTAAGAATAGTAATATATATAGTACAGATGTTAAGT
AGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATATCCAACAG
ATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACGTT
GGAAGCAACGGTGGAGACAGATCTTGGCTTTAGCCGATAGCATATATTCATTTCCTG
ATCCGCCTGCTGATTCGCCTCTTGATCGGGCTATACAACATCTGCAGAGACTTACTA
TCCAGGATCTCCCCGATCCTCCAACCAATCTTCCAGAGTCTCCAGAGAGCACTAACA
GCAATCAGAGACTGGCTGAGGCTTAAAGCAGCCTACCTGCAGTATGGGTGCGAGTGG
ATCCAAGAAGCGTTCCAAGCCCTTGCAAGGACTACAAGAGAGACTCTTGCAGGCGCG
GGG

FIG. 22A

MKGSKNQLLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTVQCLPDND
DYQEIALNVTEAFDAWDNTVTEQAVEDVWNLFETSIKPCVKLTPLCVGAGHCNTSVIKESCD
KHYWDAMRFRYCAPPGFALLRCNDINYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRTE
NRTYIYWHGKNNRTIISLNNFYNLTMHCKRPGNKGAGKPRQAWCWFKGEWKEAMQEVKETLA
KHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCDMTWFLNWVDNRTGQKQRNY
APCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTDITFSAEVAELYRLE
LGDYKLVEITPIGFAPTSVKRYSSAHQRHTRGVFVLGFLGFLATAGSAMGAASVTLTAQSRT
SLTGIVQQQQQLLDVVKKQQEMLRLTVWGTKNLQARVTAIEKYLKDQAQLNSWGCAFRQVCH
TSVPWVNDSLTPDWNNMTWQEWEQKVRYWEANISQSLEQAQIQQEKNLYELQKLNSWGVFTN
WLDFTSWVRYIQYGVYVVVGIVALRIVIYIVQMLSRLRKGYRPVFSSPPGYIQQIHIHKDQE
QPAREETEEDVGSNGGDRSWL*PIAYIHFLIRLLIRLLIGLYNICRDLLSRISPILQPIFQS
LQRALTAIRDWLRLKAAYLQYGCEWIQEAFQALARTTRETLAGAG

FIG. 22B

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTGTACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACTGTACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTTTAAATGTAACAGAGGCTTTCGATGCATGGGATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGGTGCCGGCCATTGCAATACATCAGTCATCAAAGAGTCATGTGAT
AAGCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAG
ATGCAATGATATTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACAT
GCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGAACAGAA
AATAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTT
TTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAG
CATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCG
AAACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGG
AAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACT
GCGACATGACTTGGTTCCTCAATTGGGTAGATAACAGGACGGGTCAGAAACAGCGCAATTAT
GCACCGTGCCATATAAGACAAATAATTAATACTTGGCACAGGGTAGGGAAAAACGTATATTT
GCCTCCCAGGGAAGGGGAGTTGACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTG
ATACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAA
TTGGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAG
ATACTCCTCTGCTCACCAGAGACATACAAGAGGTGTGTTCGTGCTAGGGTTCTTGGGTTTTC
TCGCAACGGCAGGTTCTGCAATGGGCGCGGCGTCGGTGACGCTGACCGCTCAGTCCCGGACT
TCATTGACTGGGATAGTGCAGCAACAGCAACAGCTGTTGGATGTGGTCAAGAAACAACAAGA
AATGTTGCGACTGACCGTCTGGGGAACTAAAAATCTCCAGGCAAGAGTCACTGCTATAGAGA
AATACCTAAAGGACCAGGCGCAGCTAAATTCATGGGGATGTGCGTTTAGACAAGTCTGCCAC
ACTTCTGTACCATGGGTAAATGATAGCTTGACACCTGATTGGAACAATATGACGTGGCAGGA
ATGGGAACAAAAAGTCCGCTACTGGGAGGCAAATATCAGTCAAAGTCTAGAACAAGCACAAA
TTCAGCAAGAAAAGAATTTGTATGAGCTGCAAAAATTAAATAGCTGGGGTGTTTTTACCAAT
TGGCTTGACTTCACCTCCTGGGTCAGGTATATTCAATATGGAGTTTACGTAGTAGTAGGAAT
AGTAGCTTTAAGAATAGTAATATATATAGTACAGATGTTAAGTAGACTTAGGAAGGGCTATA
GGCCTGTTTTCTCCTCCCCCCCCGGTTATATCCAACAGATCCATATCCACAAGGACCAGGAA
CAGCCAGCCAGAGAAGAAACAGAAGAAGACGTTGGAAGCAACGGTGGAGACAGATCTTGGCT
TTAGCCGATAGCATATATTCATTTCCTGATCCGCCTGCTGATTCGCCTCTTGATCGGGCTAT
ACAACATCTGCAGAGACTTACTATCCAGGATCTCCCCGATCCTCCAACCAATCTTCCAGAGT
CTCCAGAGAGCACTAACAGCAATCAGAGACTGGCTGAGGCTTAAAGCAGCCTACCTGCAGTA
TGGGTGCGAGTGGATCCAAGAAGCGTTCCAAGCCCTTGCAAGGACTACAAGAGAGACTCTTG
CAGGCGCGGGG

FIG. 22C

MKGSKNQLLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTVQCLPDND
DYQEIALNVTEAFDAWDNTVTEQAVEDVWNLFETSIKPCVKLTPLCVGAGHCNTSVIKESCD
KHYWDAMRFRYCAPPGFALLRCNDINYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRTE
NRTYIYWHGKNNRTIISLNNFYNLTMHCKRPGNKGAGKPRQAWCWFKGEWKEAMQEVKETLA
KHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCDMTWFLNWVDNRTGQKQRNY
APCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTDITFSAEVAELYRLE
LGDYKLVEITPIGFAPTSVKRYSSAHQRHTR

FIG. 22D

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTGTACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACTGTACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTTTAAATGTAACAGAGGCTTTCGATGCATGGGATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGGTGCCGGCCATTGCAATACATCAGTCATCAAAGAGTCATGTGAT
AAGCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAG
ATGCAATGATATTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACAT
GCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGAACAGAA
AATAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTT
TTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAG
CATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCG
AAACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGG
AAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACT
GCGACATGACTTGGTTCCTCAATTGGGTAGATAACAGGACGGGTCAGAAACAGCGCAATTAT
GCACCGTGCCATATAAGACAAATAATTAATACTTGGCACAGGGTAGGGAAAAACGTATATTT
GCCTCCCAGGGAAGGGGAGTTGACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTG
ATACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAA
TTGGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAG
ATACTCCTCTGCTCACCAGAGACATACAAGA

FIG. 22E

GVFVLGFLGFLATAGSAMGAASVTLTAQSRTSLTGIVQQQQQLLDVVKKQQEMLRLTVWGTK
NLQARVTAIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEA
NISQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVYVVVGIVALRIVIYIV
QMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDRSWL*PIAYIHFLI
RLLIRLLIGLYNICRDLLSRISPILQPIFQSLQRALTAIRDWLRLKAAYLQYGCEWIQEAFQ
ALARTTRETLAGAG

FIG. 22F

GGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGCGCGGC
GTCGGTGACGCTGACCGCTCAGTCCCGGACTTCATTGACTGGGATAGTGCAGCAACAGCAAC
AGCTGTTGGATGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAA
AATCTCCAGGCAAGAGTCACTGCTATAGAGAAATACCTAAAGGACCAGGCGCAGCTAAATTC
ATGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGA
CACCTGATTGGAACAATATGACGTGGCAGGAATGGGAACAAAAAGTCCGCTACTGGGAGGCA
AATATCAGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCA
AAAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATA
TTCAATATGGAGTTTACGTAGTAGTAGGAATAGTAGCTTTAAGAATAGTAATATATATAGTA
CAGATGTTAAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATAT
CCAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACG
TTGGAAGCAACGGTGGAGACAGATCTTGGCTTTAGCCGATAGCATATATTCATTTCCTGATC
CGCCTGCTGATTCGCCTCTTGATCGGGCTATACAACATCTGCAGAGACTTACTATCCAGGAT
CTCCCCGATCCTCCAACCAATCTTCCAGAGTCTCCAGAGAGCACTAACAGCAATCAGAGACT
GGCTGAGGCTTAAAGCAGCCTACCTGCAGTATGGGTGCGAGTGGATCCAAGAAGCGTTCCAA
GCCCTTGCAAGGACTACAAGAGAGACTCTTGCAGGCGCGGGG

FIG. 23A

MKGSKNQPLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTVQCLPDND
DYQEIALNVTEAFDAWDNTVTEQAVEDVWNLSETSIKPCVKLTPLCVGAGHCNTSVITESCD
KHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRAE
NRTYIYWHGKNDRTIISLNNFYNLTMHCKRPGNKGAGKPRQAWCWFKGEWKEAMQEVKETLA
KHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCDMTWFLNWVENRTGQKQRNY
APCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTDITFSAEVAELYRLE
LGDYKLVEITPIGFAPTSVKRYSSAHQRHTRGVFVLGFLGFLATAGSAMGAASVTLTAQSRT
SLTGVVQQQQQLLDVVKKQQEMLRLTVWGTKNLQARVTAIEKYLKDQAQLNSWGCAFRQVCH
TSVPWVNDSLTPDWNNMTWQEWEQKVRYWEANISQSLEQAQIQQEKNLYELQKLNSWGVFTN
WLDFTSWVRYIQYGVYVVVGIVALRIVIYIVQMLSRLRKGYRPVFSSPPGYIQQIHIHKDQE
QPAREETEEDVGSNGGDKSWL

FIG. 23B

ATGAAGGGTAGTAAGAATCAACCGCTGATTGCTATTGTACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCGTACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTTTAAATGTAACAGAGGCTTTCGATGCATGGGATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATCTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGGTGCCGGCCATTGCAATACATCAGTCATCACAGAGTCATGTGAT
AAGCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCTTACTAAG
ATGCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACAT
GCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGAGCAGAA
AATAGAACATATATCTATTGGCATGGTAAAAATGACAGAACTATTATCAGCTTAAATAACTT
TTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAG
CATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCG
AAACATCCTAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGG
AAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACT
GCGACATGACTTGGTTCCTCAATTGGGTAGAAAACAGGACGGGTCAGAAACAGCGTAATTAT
GCACCGTGCCATATAAGGCAAATAATTAATACTTGGCACAGGGTAGGGAAAAACGTATATTT
GCCTCCCAGGGAAGGGGAGTTAACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTG
ATACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGGTTGGAA
TTGGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAG
ATACTCCTCTGCTCACCAGAGACATACAAGAGGTGTGTTCGTGCTAGGGTTCTTGGGTTTTC
TCGCAACGGCAGGTTCTGCAATGGGCGCGGCGTCGGTGACGCTGACCGCTCAGTCCCGGACT
TCATTGACTGGGGTAGTGCAGCAACAGCAACAGCTGTTGGATGTGGTCAAGAAACAACAAGA
AATGTTGCGACTGACCGTCTGGGGAACTAAAAATCTCCAGGCAAGAGTCACTGCTATAGAGA
AATACCTAAAGGACCAGGCGCAGCTAAATTCATGGGGATGTGCGTTTAGACAAGTCTGCCAC
ACTTCTGTACCATGGGTAAATGATAGCTTGACACCTGATTGGAACAATATGACGTGGCAGGA
ATGGGAACAAAAAGTCCGCTACTGGGAGGCAAATATCAGTCAAAGTCTAGAACAAGCACAAA
TTCAGCAAGAAAAGAATTTGTATGAGCTGCAAAAATTAAATAGCTGGGGTGTTTTTACCAAT
TGGCTTGACTTCACCTCCTGGGTCAGGTATATTCAATATGGAGTTTATGTAGTAGTAGGAAT
AGTAGCTTTAAGAATAGTAATATATATAGTACAGATGTTGAGTAGACTTAGGAAGGGCTATA
GGCCTGTTTTCTCCTCCCCCCCCGGTTATATCCAACAGATCCATATCCACAAGGACCAGGAA
CAGCCAGCCAGAGAAGAAACAGAAGAAGACGTTGGAAGCAACGGTGGAGACAAATCTTGGCT
TTAG

FIG. 23C

MKGSKNQPLIAIVLASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTVQCLPDND
DYQEIALNVTEAFDAWDNTVTEQAVEDVWNLSETSIKPCVKLTPLCVGAGHCNTSVITESCD
KHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATCTRMMETQSSTWFGFNGTRAE
NRTYIYWHGKNDRTIISLNNFYNLTMHCKRPGNKGAGKPRQAWCWFKGEWKEAMQEVKETLA
KHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYCDMTWFLNWVENRTGQKQRNY
APCHIRQIINTWHRVGKNVYLPPREGELTCNSTVTSIIANIDTGDQTDITFSAEVAELYRLE
LGDYKLVEITPIGFAPTSVKRYSSAHQRHTR

FIG. 23D

ATGAAGGGTAGTAAGAATCAACCGCTGATTGCTATTGTACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCGTACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTTTAAATGTAACAGAGGCTTTCGATGCATGGGATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATCTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGGTGCCGGCCATTGCAATACATCAGTCATCACAGAGTCATGTGAT
AAGCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCTTACTAAG
ATGCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACAT
GCACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGCTTTAATGGCACTAGAGCAGAA
AATAGAACATATATCTATTGGCATGGTAAAAATGACAGAACTATTATCAGCTTAAATAACTT
TTATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAG
CATGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCG
AAACATCCTAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGG
AAGAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACT
GCGACATGACTTGGTTCCTCAATTGGGTAGAAAACAGGACGGGTCAGAAACAGCGTAATTAT
GCACCGTGCCATATAAGGCAAATAATTAATACTTGGCACAGGGTAGGGAAAAACGTATATTT
GCCTCCCAGGGAAGGGGAGTTAACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTG
ATACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGGTTGGAA
TTGGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAG
ATACTCCTCTGCTCACCAGAGACATACAAGA

FIG. 23E

GVFVLGFLGFLATAGSAMGAASVTLTAQSRTSLTGVVQQQQQLLDVVKKQQEMLRLTVWGTK
NLQARVTAIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEA
NISQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVYVVVGIVALRIVIYIV
QMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDKSWL

FIG. 23F

GGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGCGCGGC
GTCGGTGACGCTGACCGCTCAGTCCCGGACTTCATTGACTGGGGTAGTGCAGCAACAGCAAC
AGCTGTTGGATGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAA
AATCTCCAGGCAAGAGTCACTGCTATAGAGAAATACCTAAAGGACCAGGCGCAGCTAAATTC
ATGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGA
CACCTGATTGGAACAATATGACGTGGCAGGAATGGGAACAAAAAGTCCGCTACTGGGAGGCA
AATATCAGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCA
AAAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATA
TTCAATATGGAGTTTATGTAGTAGTAGGAATAGTAGCTTTAAGAATAGTAATATATATAGTA
CAGATGTTGAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATAT
CCAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACG
TTGGAAGCAACGGTGGAGACAAATCTTGGCTTTAG

FIG. 24A

MKGSKNQLLIAIILASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQCLPDND
DYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCTRNMTTSTGTT
DTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYTGAWYSKDVICDNNTS
SRSKCYMNHCNTSVITESCDKHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATC
TRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIISLNNFYNLTMHCKRPGNKGAGKPRQA
WCWFKGEWKEAMQEVKETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYC
NMAWFLNWVDNRTGQKQRNYAPCHIRQIINTWHRVGKNIYLPPREGELTCNSTVTSIIANID
TGDQTDITFSAEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTRGVFVLGFLGFL
ATAGSAMGAASVTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLTVWGTKNLQTRVTAIEK
YLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEANISQSLEQAQI
QQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVYVVVGIVTLRIVIYIVQMLSRLRKGYR
PVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDRSWL

FIG. 24B

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTATACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGATGCATGGAATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGCAATGAACTGTACAAGGAACATGACCACATCCACAGGGACCACA
GACACCCAAAATATCACAATTATAAATGACACTTCGCCATGCGTACGTGCAGACAACTGCAC
AGGATTAAAGGAGGAAGAAATGGTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACA
AGAGAAAACAGTATACTGGAGCATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCA
AGTCGGAGCAAGTGTTACATGAACCATTGCAATACATCAGTCATCACAGAGTCATGTGATAA
GCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGAT
GCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACATGC
ACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGATTTAATGGCACTAGAGCAGAAAA
TAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTTTT
ATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAGCA
TGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCGAA
ACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGGAA
GAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACTGC
AACATGGCTTGGTTCCTCAATTGGGTAGATAACAGGACGGGTCAGAAACAGCGCAATTATGC
ACCGTGCCATATAAGGCAAATAATTAATACTTGGCACAGGGTAGGGAAAAACATATATTTGC
CTCCCAGGGAAGGGGAGTTGACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTGAT
ACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAATT
GGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAGAT
ACTCCTCTGCTCACCAGAGACATACAAGAGGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTC
GCAACGGCAGGTTCTGCAATGGGCGCGGCGTCGGTGACGCTGACCGCCCAGTCCCGGACTTC
ATTGGCTGGGATAGTGCAGCAACAGCAACAGCTGTTGGACGTGGTCAAGAAACAACAAGAAA
TGTTGCGACTGACCGTCTGGGGAACTAAAAATCTCCAGACAAGAGTCACTGCTATAGAGAAA
TACCTAAAGGACCAGGCGCAGTTAAATTCATGGGGATGTGCGTTTAGACAAGTCTGCCACAC
TTCTGTACCATGGGTAAATGATAGCTTGACACCTGATTGGAACAATATGACGTGGCAGGAAT
GGGAACAGAAAGTCCGCTACTGGGAGGCAAATATCAGTCAAAGTCTAGAACAAGCACAAATT
CAGCAAGAAAAGAATTTGTATGAGCTGCAAAAATTAAATAGCTGGGGTGTTTTTACCAATTG
GCTTGACTTCACCTCCTGGGTCAGGTATATTCAATATGGAGTTTATGTAGTAGTAGGAATAG
TAACTTTAAGAATAGTAATATATATAGTACAGATGTTAAGTAGACTTAGGAAGGGCTATAGG
CCTGTTTTCTCCTCCCCCCCCGGTTATATCCAACAGATCCATATCCACAAGGACCAGGAACA
GCCAGCCAGAGAAGAAACAGAAGAAGACGTTGGAAGCAACGGTGGAGACAGATCTTGGCTTT
AGCCGATAGCATATATTCATTTCCTGATCCGCCTGCTGATTCGCCTCTTGATCGGGCTATAC
AACATCTGCAGAGACTTACTATCCAGGATCTCCCCGATCCTCCAACCAATCTTCCAGAGTCT
CCAGAGAGCACTAACAGCAATCAGAGACTGGCTGAGGCTTAAAGCAGCCTACCTGCAGTATG
GGTGCGAGTGGATCCAAGAAGCGTTCCAAGCCCTTGCAAGGACTACAAGAGAGACTCTTGCA
GGCGCGGGG

FIG. 24C

MKGSKNQLLIAIILASAYLTHCKQFVTVFYGIPAWRNASIPLFCATKNRDTWGTIQCLPDND
DYQEIALNVTEAFDAWNNTVTEQAVEDVWNLFETSIKPCVKLTPLCVAMNCTRNMTTSTGTT
DTQNITIINDTSPCVRADNCTGLKEEEMVDCQFNMTGLERDKRKQYTGAWYSKDVICDNNTS
SRSKCYMNHCNTSVITESCDKHYWDAMRFRYCAPPGFALLRCNDTNYSGFAPNCSKVVAATC
TRMMETQSSTWFGFNGTRAENRTYIYWHGKNNRTIISLNNFYNLTMHCKRPGNKGAGKPRQA
WCWFKGEWKEAMQEVKETLAKHPRYKGNRSRTENIKFKAPGRGSDPEAAYMWTNCRGEFLYC
NMAWFLNWVDNRTGQKQRNYAPCHIRQIINTWHRVGKNIYLPPREGELTCNSTVTSIIANID
TGDQTDITFSAEVAELYRLELGDYKLVEITPIGFAPTSVKRYSSAHQRHTR

FIG. 24D

ATGAAGGGTAGTAAGAATCAACTGCTGATTGCTATTATACTAGCTAGTGCTTACCTAACACA
TTGCAAGCAATTTGTGACTGTTTTCTATGGCATACCCGCGTGGAGGAATGCATCCATTCCCC
TGTTTTGTGCAACCAAAAATAGAGATACTTGGGGAACCATACAGTGCTTGCCAGACAATGAT
GATTATCAGGAAATAGCTCTAAATGTAACAGAGGCTTTCGATGCATGGAATAATACAGTAAC
AGAACAAGCAGTGGAGGATGTCTGGAATCTATTTGAGACATCAATAAAACCATGTGTCAAAT
TAACACCCTTATGTGTAGCAATGAACTGTACAAGGAACATGACCACATCCACAGGGACCACA
GACACCCAAAATATCACAATTATAAATGACACTTCGCCATGCGTACGTGCAGACAACTGCAC
AGGATTAAAGGAGGAAGAAATGGTCGACTGTCAGTTTAATATGACAGGATTAGAGAGAGACA
AGAGAAAACAGTATACTGGAGCATGGTACTCAAAAGATGTGATTTGTGACAATAACACCTCA
AGTCGGAGCAAGTGTTACATGAACCATTGCAATACATCAGTCATCACAGAGTCATGTGATAA
GCACTATTGGGATGCTATGAGGTTTAGATACTGTGCACCACCGGGTTTTGCCCTACTAAGAT
GCAATGATACTAATTATTCAGGCTTTGCACCTAATTGCTCTAAAGTAGTAGCTGCTACATGC
ACCAGAATGATGGAAACGCAATCTTCTACATGGTTTGGATTTAATGGCACTAGAGCAGAAAA
TAGAACATATATCTATTGGCATGGTAAAAATAACAGAACTATTATCAGCTTAAATAACTTTT
ATAATCTCACTATGCATTGTAAGAGGCCGGGAAATAAGGGTGCCGGCAAACCCAGGCAAGCA
TGGTGTTGGTTCAAAGGCGAATGGAAGGAAGCCATGCAGGAGGTGAAGGAGACCCTTGCGAA
ACATCCCAGATATAAAGGGAACAGGAGCCGCACAGAGAATATTAAATTTAAAGCACCAGGAA
GAGGCTCAGACCCAGAAGCAGCATACATGTGGACTAACTGCAGAGGGGAATTTCTCTACTGC
AACATGGCTTGGTTCCTCAATTGGGTAGATAACAGGACGGGTCAGAAACAGCGCAATTATGC
ACCGTGCCATATAAGGCAAATAATTAATACTTGGCACAGGGTAGGGAAAAACATATATTTGC
CTCCCAGGGAAGGGGAGTTGACCTGCAACTCAACAGTGACCAGCATAATTGCCAACATTGAT
ACGGGAGATCAAACAGATATTACCTTTAGTGCAGAGGTGGCAGAACTATACCGATTGGAATT
GGGAGATTACAAATTAGTAGAAATCACACCAATTGGCTTCGCACCTACATCAGTAAAGAGAT
ACTCCTCTGCTCACCAGAGACATACAAGA

FIG. 24E

GVFVLGFLGFLATAGSAMGAASVTLTAQSRTSLAGIVQQQQQLLDVVKKQQEMLRLTVWGTK
NLQTRVTAIEKYLKDQAQLNSWGCAFRQVCHTSVPWVNDSLTPDWNNMTWQEWEQKVRYWEA
NISQSLEQAQIQQEKNLYELQKLNSWGVFTNWLDFTSWVRYIQYGVYVVVGIVTLRIVIYIV
QMLSRLRKGYRPVFSSPPGYIQQIHIHKDQEQPAREETEEDVGSNGGDRSWL

FIG. 24F

GGTGTGTTCGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGCGCGGC
GTCGGTGACGCTGACCGCCCAGTCCCGGACTTCATTGGCTGGGATAGTGCAGCAACAGCAAC
AGCTGTTGGACGTGGTCAAGAAACAACAAGAAATGTTGCGACTGACCGTCTGGGGAACTAAA
AATCTCCAGACAAGAGTCACTGCTATAGAGAAATACCTAAAGGACCAGGCGCAGTTAAATTC
ATGGGGATGTGCGTTTAGACAAGTCTGCCACACTTCTGTACCATGGGTAAATGATAGCTTGA
CACCTGATTGGAACAATATGACGTGGCAGGAATGGGAACAGAAAGTCCGCTACTGGGAGGCA
AATATCAGTCAAAGTCTAGAACAAGCACAAATTCAGCAAGAAAAGAATTTGTATGAGCTGCA
AAAATTAAATAGCTGGGGTGTTTTTACCAATTGGCTTGACTTCACCTCCTGGGTCAGGTATA
TTCAATATGGAGTTTATGTAGTAGTAGGAATAGTAACTTTAAGAATAGTAATATATATAGTA
CAGATGTTAAGTAGACTTAGGAAGGGCTATAGGCCTGTTTTCTCCTCCCCCCCCGGTTATAT
CCAACAGATCCATATCCACAAGGACCAGGAACAGCCAGCCAGAGAAGAAACAGAAGAAGACG
TTGGAAGCAACGGTGGAGACAGATCTTGGCTTTAG